

Expert Sleepers Silent Way v2.3.0 User Manual

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Introduction

Silent Way is a suite of plug-ins designed for use with analogue synthesisers, and especially as part of a modular analogue synthesiser system. The plug-ins produce no sound themselves, nor do they process sound - rather, they generate signals to be used as control voltages (CVs), which can be patched into the control inputs of oscillators, filters, VCAs etc. of an analogue system. Also, with the addition of the CV Input plug-in, it is possible to bring CVs from the synth into the computer, for recording or processing.

For the Silent Way plug-ins to work via the outputs of a computer audio interface, the interface needs to be “DC coupled” i.e. capable of maintaining a DC voltage at its outputs. Many interfaces include high-pass filters on the outputs which makes this impossible. Refer to the Expert Sleepers website for up-to-date information on compatible devices and cabling recommendations. Also, please see [Silent Way AC Encoder](#) below for information on how Silent Way may be used with almost any audio interface, even if not DC coupled.

Some Silent Way plug-ins provide specific support for Expert Sleepers hardware. Please visit the [website](#) for the range of hardware available, most of which is designed to provide superior connectivity options as compared to simply using the analogue outputs of an audio interface.

There are currently twenty plug-ins in the Silent Way suite - Silent Way AC Encoder, Silent Way CV Input, Silent Way CV To MIDI, Silent Way CV To OSC , Silent Way DC, Silent Way ES-4 Controller, Silent Way ES-5 Controller, Silent Way ESX-4CV Combiner, Silent Way ESX-8CV Combiner, Silent Way Follower, Silent Way Function, Silent Way Learner, Silent Way LFO, Silent Way Quantizer, Silent Way SMUX, Silent Way Soundplane, Silent Way Step LFO, Silent Way Sync , Silent Way Trigger and Silent Way Voice Controller. These are described in more detail below.

Installation

Mac OS X, Audio Unit (AU)

The plug-in file is named "ExSlSilentWay.component".

Simply copy the file to the folder:

Library/Audio/Plug-Ins/Components

Mac OS X, VST

The plug-in file is named "ExSlSilentWay.vst".

Simply copy the file to the folder:

Library/Audio/Plug-Ins/VST

Mac OS X, AAX

The plug-in file is named "ExSlSilentWay.aaxplugin".

Simply copy the file to the folder:

/Library/Application Support/Avid/Audio/Plug-Ins

Windows (VST)

The plug-in files are named "silentway.dll" (32 bit version) and "silentway_x64.dll" (64 bit version).

Simply copy the files to your VST plug-ins folder.

System Requirements

Mac OS X

Silent Way requires at least Mac OS X version 10.6.8. The plug-in is Intel-only, and built for both 32 and 64 bit. The Audio Unit version will work in any Audio Unit host. The VST version requires a “VST 2.4” compatible host.¹ The AAX version requires Pro Tools 10 (10.3.2 or above recommended).

Windows

Silent Way has been developed and tested with Windows XP SP2 and Windows 7. It may work with other versions of Windows (Vista included) but this is by no means guaranteed.

The plug-in requires a “VST 2.4” compatible host.

¹ VST is a trademark of Steinberg Media Technologies GmbH.

Hardware/Cabling Requirements

For most of the Silent Way plug-ins to work, the audio interface between the computer and the synth needs to be “DC coupled” i.e. capable of maintaining a DC voltage at its outputs. Refer to [this page](#) on the Expert Sleepers website for up-to-date information on compatible devices.

The exceptions to this are Silent Way CV Input, which has no special requirements and should work with any audio interface, Silent Way CV To OSC, which in general only handles signals within the computer itself, and [Silent Way AC Encoder](#), which is specifically designed to remove the need for DC coupled interfaces.

In most cases special cables are recommended when using a DC coupled audio interface as a source of CVs. Most audio interfaces have balanced outputs (on TRS ('stereo') jacks or XLRs), while synth CV inputs are unbalanced (usually on TS ('mono') jacks or minijacks). If you use a regular stereo or mono jack lead, you'll be shorting out one of the balanced output signals (usually the R (ring) to the S (shield)). While this probably wouldn't be a problem for normal audio use, when outputting the sustained voltages that are useful as CVs you risk damaging the interface hardware.

The usual recommendation is to make up special cables with a TRS jack at one end and a TS jack at the other, connecting T->T (tip to tip) and S->S (shield to shield) while leaving the R (ring) floating i.e. unconnected. (Such cables can be purchased ready-made from [Expert Sleepers](#).)

An alternative is to wire a TRS jack to two TS jacks, connecting one T->T/S->S and the other R->T/S->S. This then gives you two copies of the output CV, one of them inverted, which is particularly useful from LFOs. Note that this cable configuration is identical to that of a regular "Y" audio insert lead.

Registration

The downloadable version of Silent Way stops working after 15 minutes every time you use it. To stop this happening, you need to buy a registration.

You can buy a registration key online using a credit card or PayPal from the Expert Sleepers Licence Manager application. See [here](#) for more information. Note that you need at least version 1.0.18 of the Licence Manager.

The e-commerce side of things is handled by [eSellerate](#). If you have any security concerns, have a look at their website which is pretty informative.

Your registration key allows you to install Silent Way on up to 3 different computers (useful if for example you have a desktop computer in the studio and a laptop for live use).

You need an internet connection to activate the software, though not necessarily on the computer on which you want to use it.

Upgrading from v1.x

Using the Expert Sleepers Licence Manager 1.0.18 (or higher) you can purchase an upgrade to v2 for less than the full cost of v2, if the Licence Manager shows v1 as activated.

Customers who purchased Silent Way v1 in 2012 are eligible for a discounted upgrade. Please contact Expert Sleepers for details, including your serial number or order number for Silent Way v1.

The Silent Way GUI

Using the controls

Knobs

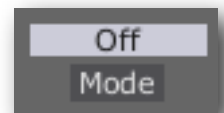
Basic use of the knobs is to click on them and drag the mouse up and down. However you can obtain different results by holding keys as follows:



- Shift : Values change more slowly as you move the mouse.
- Command¹ (Mac OS X) / Alt (Windows) : The knob assumes its default position.
- Option² (Mac OS X) / Control (Windows): The knob assumes integer values only.
- Double-click: The knob returns to its default value.
- Command / Alt + double-click: The knob assumes the value zero.

Dropdown menus

Clicking on the menu displays the list of options. Move the mouse over the desired option and release the mouse to select it.



Value edit boxes

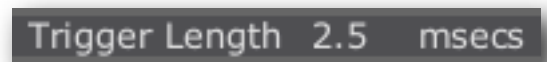
These boxes (below each knob and slider) let you enter parameter values directly. Clicking on the value highlights it in green - you can then type the desired value using the keyboard. Press enter to finish and accept the new value.

While you're typing the value, the box goes red to indicate that the value you see has not yet been accepted.

While the box is highlighted (green), using the cursor keys on your keyboard (up/down/left/right) will change the value by the smallest increment.

Name/value display

As you move the mouse around the interface, the name and current value of the control currently under the mouse is displayed in the top right of the window. This area also provides tool-tips for buttons.



¹ The 'Command' key is also known as the 'Apple' key - the one next to the spacebar.

² The 'Option' (alt) key is the one between the Control (ctrl) key and the Command (cmd) key.

Getting Started

Tutorial Videos

There are a number of tutorial videos on the Expert Sleepers website, [here](#)¹. These mostly cover the basic setup of the Voice Controller plug-in in various DAWs, since this is the first thing most people want to do with Silent Way.

Other Demo Videos

There are many more videos that demo specific features or techniques on our Vimeo channel, [here](#)². Or if you prefer YouTube, [here](#)³.

Join the forum

Silent Way has a very active community of users participating in the forum, [here](#)⁴. This is a great place to ask questions and to get inspiration from how other people are using the software.

Which plug-in to try first?

Unless you're using one of the Expert Sleepers hardware modules which require a specific plug-in (e.g. the ES-4 / the ES-4 Controller plug-in), you probably want to start with the Silent Way [Voice Controller](#) or possibly the Silent Way [LFO](#). If you find you're struggling to get things to work as expected, Silent Way [DC](#) is the absolute simplest plug-in, which is very useful for checking your basic connections (in software and in hardware).

¹ <http://expert-sleepers.co.uk/siwayatutorials.html>

² <http://vimeo.com/channels/126094>

³ <http://www.youtube.com/user/expertsleepers>

⁴ <http://www.muffwiggler.com/forum/viewforum.php?f=35>

Plug-in Overview

Silent Way [AC Encoder](#)

Allows the use of non-DC-coupled audio interfaces.

Silent Way [CV Input](#)

A means of getting CVs back into the computer.

Silent Way [CV To MIDI](#)

Converts CVs (from e.g. CV Input, or the LFO) to MIDI.

Silent Way [CV To OSC](#)

Converts CVs (from e.g. CV Input, or the LFO) to OSC.

Silent Way [DC](#)

Generates a simple constant CV. Also provides simple CV scaling / offsets.

Silent Way [ES-4 Controller](#)

Supports the Expert Sleepers ES-4 hardware module.

Silent Way [ES-5 Controller](#)

Supports the Expert Sleepers ES-5 hardware module.

Silent Way [ESX-4CV Combiner](#)

Supports the Expert Sleepers ESX-4CV hardware module.

Silent Way [ESX-8CV Combiner](#)

Supports the Expert Sleepers ESX-8CV hardware module.

Silent Way [Follower](#)

Provides pitch and envelope tracking.

Silent Way [Function](#)

Applies simple mathematical operations to CVs.

Silent Way [Learner](#)

Handles MIDI and OSC remote control of all Silent Way plug-ins.

Silent Way [LFO](#)

A versatile low frequency oscillator.

Silent Way [Logic Project](#)

Stores project settings specific to Apple Logic Pro.

Silent Way [Quantizer](#)

Quantizes CVs e.g. to a musical scale.

Silent Way [SMUX](#)

Allows use of all 8 outputs from an ES-3 module when running at 88.1/96kHz.

Silent Way [Soundplane](#)

Supports the [Madrona Labs](#) Soundplane instrument.

Silent Way [Step LFO](#)

An LFO most often useful as a step sequencer.

Silent Way [Sync](#)

Generates clock pulses (including DINsync).

Silent Way [Trigger](#)

Generates a gate, trigger or envelope.

Silent Way [Voice Controller](#)

A “MIDI/CV Interface” in a plug-in, including oscillator pitch calibration.

Silent Way AC Encoder



Introduction

Silent Way AC Encoder removes the need for a DC coupled audio interface (see [above](#)) and lets you use Silent Way with almost any audio interface.

For this to work, you must either:

- make some special cables, or
- use a hardware module specifically designed to work with Silent Way AC Encoder, for example, the [Expert Sleepers ES-1](#) module.

The cables are a very simple job, well within the scope of anyone with basic soldering skills.

Because the details are currently quite fluid, as we gather more and more information about what works best, we do not describe them here. For up-to-date information, please refer to the page on our website:

<http://www.expert-sleepers.co.uk/siwaacencoder.html>

Note that without additional circuitry or processing the CVs recovered from the AC Encoder system will be positive voltages only. In practice this is often not a problem, and if it is there are a number of modules on the market that will provide a DC offset (e.g. Doepfer A-183-2 or A-138).

In Use

To use Silent Way AC Encoder simply insert an instance of the plug-in on each track that is generating CVs, after all the other plug-ins. The AC Encoder receives the CVs as inputs and uses them to modulate a very high frequency audio signal, which is then output from the audio interface.

Each channel has a small number of controls, as follows.

Enable

This button simply enables the AC Encoder's processing. It is provided only so that the plug-in doesn't start emitting a potentially very loud audio signal as soon as it's loaded - it will always be turned on in normal use.

Input Polarity

Each channel can operate in either bipolar or unipolar mode. These modes define the range of input signals that the plug-in can handle, and that will be mapped onto the range of output voltages (which in the absence of further processing are only positive, as noted above).

In bipolar mode, input values in the range -1.0 to +1.0 are mapped across the output voltage range. In unipolar mode, input values in the range 0.0 to +1.0 are mapped across the output voltage range. In both cases, input values outside of those ranges are clamped.

Min Out/Max Out

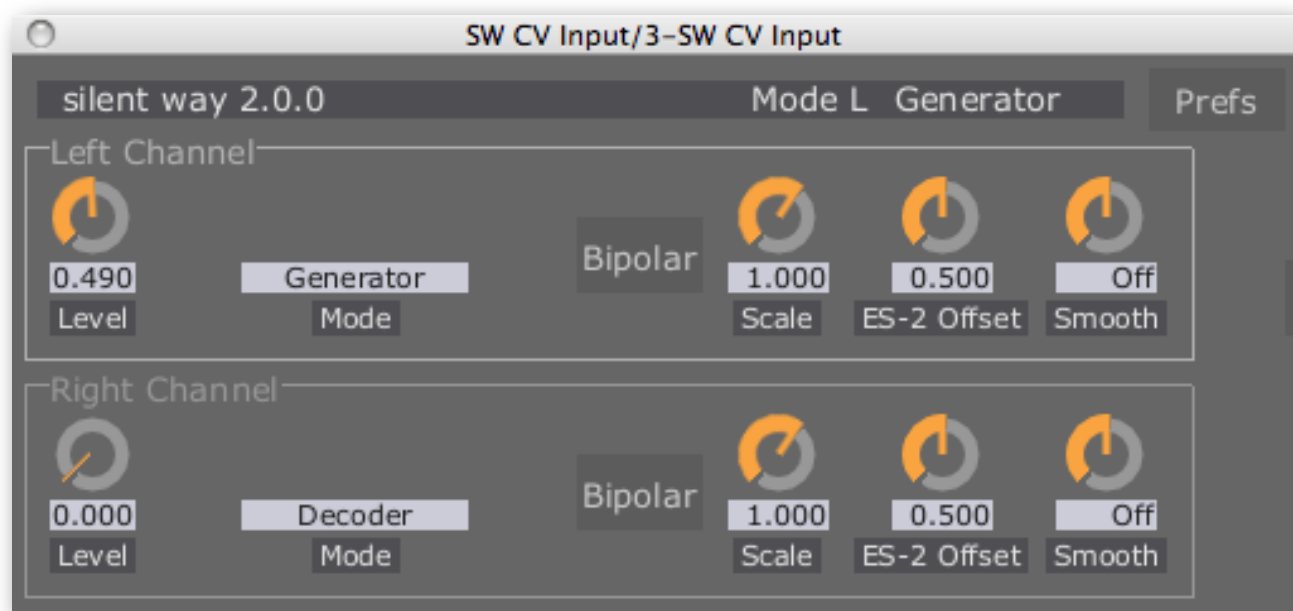
These two controls set the minimum and maximum voltages that the AC Encoder will attempt to output from the interface. In an ideal world these would be left at 0.0 and 1.0 respectively to maximise the possible range of voltages. However sometimes this is not the best solution in practice. For example, the simple rectifier circuit as described on the website usually suffers from a 'dead zone' at low voltages. In this case, you would want to raise the Min Out setting so that the plug-in would only output voltages above the dead zone. Similarly, some systems exhibit nonlinearities at higher voltages, in which case you would bring down the Max Out setting to avoid these effects.

6-channel VST

A second version of the plug-in which processes six channels at once is provided for the convenience of Cubase users, so that the plug-in can be inserted on the output of a Silent Way [Voice Controller](#) plug-in.



Silent Way CV Input



Introduction

Silent Way CV Input provides a means of getting control voltages from an analogue synth into the computer, which is not normally possible since the DC voltages of CVs are blocked by the inputs of all current audio interfaces. Once inside the computer, CVs can be recorded, or processed as any other signal before being output back to the synth.

It operates as a stereo or mono plug-in. In stereo mode, the two channels are independent and have identical controls. In mono mode, the 'Right Channel' controls are not used.

There are two main usages for the plug-in - with an off-the-shelf VCA, and with the [Expert Sleepers ES-2](#) module (a hardware device specially designed to work with the Silent Way CV Input plug-in).

Setup – with VCA

In this mode, the Silent Way CV Input plug-in is used in conjunction with a VCA of some kind (which includes some 'ring modulator' devices).

An instance of the plug-in is loaded in the host, and one of its channels switched to 'Generator' mode (as in the image above). The output of this channel should be routed out of the computer and into the 'signal' input of the VCA. The CV that you want to get into the computer should be connected to the 'CV' input of the VCA.

The output of the VCA should then be routed back to the computer, and fed into an instance of the CV Input plug-in (this could be the other half of the Generator plug-in, or a

new instance) which is put in 'Decoder' mode. The output of this plug-in is the desired CV.

Note that the Generator level (see below) defaults to zero so you need to turn it up before anything will happen. The reason for this is to avoid situations where you might accidentally feed the generated signal out to your speakers and cause damage to your equipment/hearing/sanity.

Unipolar/Bipolar Operation

CVs can be unipolar - i.e. they take positive values only e.g. 0V-10V - or they can be bipolar - i.e. they can take both positive and negative values.

A rectangular button with a dark grey background and the word "Bipolar" in white text.

Most VCA designs can only handle unipolar CVs. If you want to use Silent Way CV Input to process bipolar CVs, you have two options:

- use hardware modules to scale and bias your CV into a unipolar range (see e.g. the Doepfer A-183-2 Offset-Generator / Attenuator / Polarizer module).
- use a four quadrant multiplier VCA. These are sometimes known as polarizing VCAs or ring modulators, though the latter is really a misnomer. See e.g. the Doepfer A-133 Dual Voltage Controlled Polarizer or the Cwejman VCO-2RM. NB if the device in question is described as a ring modulator it should be described as 'DC coupled' if it's to work with Silent Way CV Input.

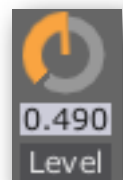
If you're using a four quadrant multiplier, switch the Decoder plug-in to Bipolar mode (i.e. press the button marked 'Bipolar'). Note that on some systems the output of the plug-in in Bipolar mode may be inverted from what you expect - if this is the case, use the 'Scale' control to invert the output signal.

Controls

The Generator/Decoder drop-down menu separates the controls for each channel into two parts, those to the left and right of the menu respectively.

A rectangular dropdown menu with a dark grey background. The word "Generator" is in white text on the top line, and "Mode" is in white text on the bottom line.

To the left of the menu is the one knob that applies in Generator mode - the 'Level' knob. This simply sets the level of the generated signal. As mentioned above it defaults to zero and must be turned up for anything useful to happen.

A circular knob with a dark grey background. It has an orange arc on the left side. Below the knob, the text "0.490" is in white, and "Level" is in white below that.

To the right of the menu are the controls that apply in Decoder mode. The 'Bipolar' button puts the Decoder into Bipolar mode, as discussed above. The 'Scale' knob is a simple multiplier on the CV. It can take negative values in order to invert the signal.



The 'ES-2 Offset' control is used only in 'ES-2 Decoder' mode - see below.

The 'Smooth' control has the same effect as that in the DC plug-in (see [below](#)).

Setup – with ES-2

In contrast to the usage with a VCA described above, using the CV Input plug-in with an ES-2 module does not require an instance of the plug-in in Generator mode. Both channels of the plug-in should be placed in 'ES-2 Decoder' mode.

Hardware setup is also much simpler. The CV of interest is connected to one of the ES-2's inputs, and the corresponding output of the ES-2 is connected to an input of your computer's audio interface. That audio input should then be routed directly into the CV Input plug-in.

The only required setup is to adjust the 'ES-2 Offset' control. This should be adjusted so that a zero CV entering the ES-2 generates a zero CV on the output of the plug-in. Note that a zero CV is not the same as simply leaving the ES-2's input unconnected - you actually need to patch the input to a source of 0V (e.g. a mixer with all the inputs turned down, or a gate signal in the 'off' state).

In this mode, the 'Bipolar' button has no effect - the ES-2 module always handles bipolar signals.

The 'Scale' knob still applies a simple scaling of the outgoing CV, and the 'Smooth' knob works as usual.

Silent Way CV To MIDI



Introduction

Silent Way CV To MIDI translates CV signals (such as those produced by Silent Way CV Input, for example) into MIDI messages. These can in turn be used to control all sorts of software and hardware devices.

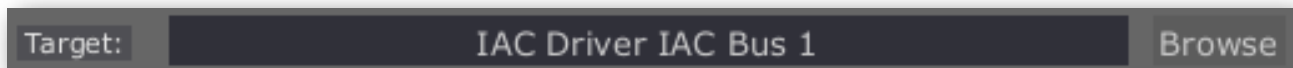
Used in conjunction with, say, Silent Way LFO, the CV To MIDI plug-in provides a standalone means of generating MIDI LFOs, giving Silent Way an application to musicians who have no analogue gear at all.

Silent Way CV To MIDI operates as a stereo or mono plug-in. In stereo mode, the two channels are independent and have identical controls. In mono mode, the 'Right Channel' controls are not used.

Setup

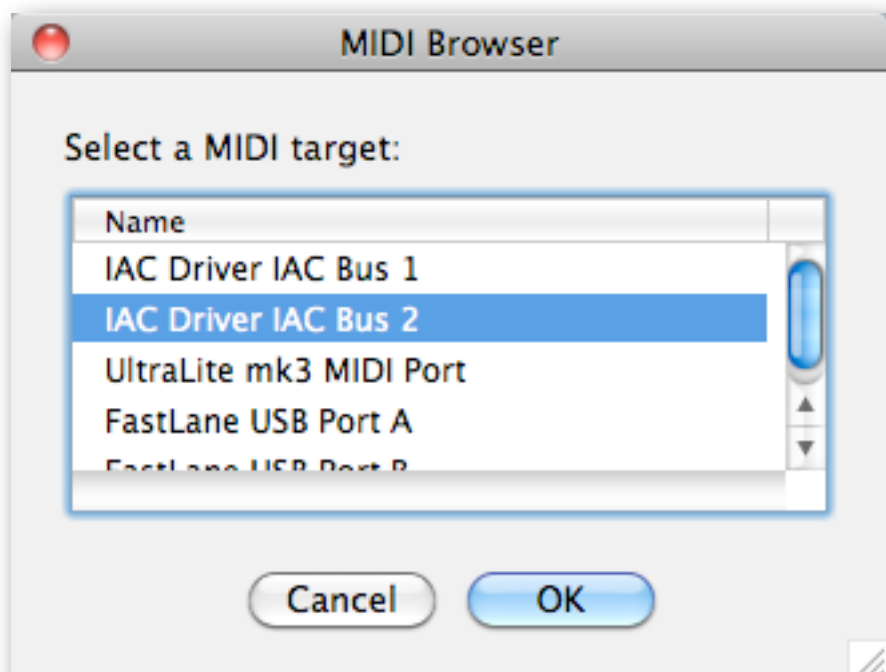
Once you have your CVs entering the plug-in (a simple matter of audio routing) you will also need to set up the MIDI target i.e. the destination to which the plug-in sends MIDI. This will either be a hardware MIDI port attached to your computer, or a virtual 'bus' used to route MIDI to other software within the computer.

Selecting the Target



The field along the bottom of the plug-in GUI shows its MIDI target. It is possible to type a value directly into this field, but it's usually much simpler to browse for the target, using the 'Browse' button to the right of the field.

Clicking this brings up a dialog which lists all the MIDI destinations that are available. Simply click on the service you want from the list and click OK.



The 'Clear' button clears out the target field, so the plug-in no longer sends MIDI to the selected target.

A rectangular button with the word 'Clear' in a light gray font.

Using the VST MIDI output

The VST version of the plug-in passes its MIDI outputs directly to the host application. If the host supports this, MIDI can be routed directly to e.g. the inputs of other plug-ins, without using an inter-application bus (see below).

Using inter-application busses

If you want the plug-in to control other software on your computer, rather than controlling external devices, you will need to route its MIDI output to a software bus.

On OS X, you can use the system's built-in 'IAC Driver'. To set this up, open the 'Audio MIDI Setup' utility, show its MIDI Window, and double click on the IAC Driver item that you see there.

On Windows, you will have to use 3rd party software, for example Hubert Winkler's Hubi's Loopback Device or Jamie O'Connell's MIDI Yoke (both freeware).

Using the connection to Silent Way Learner

Enabling the 'Learner' button causes the plug-in to send its output directly to [Silent Way Learner](#). This provides a very convenient means to e.g. control any parameter of any Silent Way plug-in with an incoming CV.

A rectangular button with a dark grey background and the word "Learner" in a light grey sans-serif font.

Preparing input CVs

The CVs as output by, for example, Silent Way LFO are very clean and will drive Silent Way CV To MIDI without any unpleasant artefacts. If, on the other hand, you are using CVs from Silent Way CV Input, you may find that the CVs are rather noisy and can produce unexpected results. The easiest solution is to apply a small amount of (negative) [smoothing](#) in the CV Input plug-in.

Other Controls

Enable/Channel

The 'Enable' button simply enables or disables MIDI output from the left or right channel of the plug-in.

The 'Channel' knob selects which MIDI channel messages are sent on (1-16).



Sending MIDI CC messages

Press the 'CC' button to enable sending of MIDI CC messages. A new message will be sent whenever the incoming CV changes enough to select a different CC value.

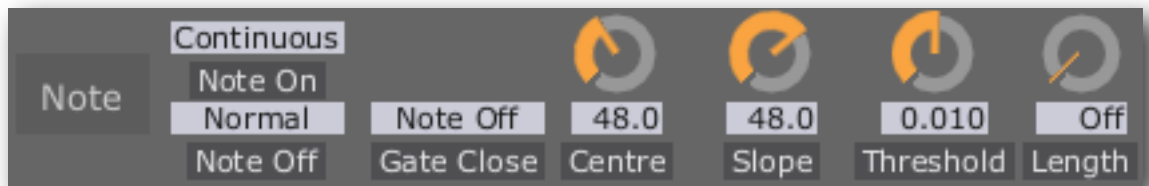
The 'CC#' control selects the CC number that will be sent (0-127). Some CC numbers correspond to specific controllers by convention e.g. CC #1 is usually sent by a keyboard's modulation wheel, but you are free to use whatever CC numbers you like.



The 'CC Min' and 'CC Max' controls set the range of incoming CVs that correspond to the full range of MIDI CC values (0-127). By default, the min is set to -1 and the max to +1, meaning that a CV value of -1 will generate a CC value of 0, and a CV value of +1 will generate a CC value of 127. If for example you change the CC Min to 0, then a CV value of

0 will generate a CC value of 0, and a CV value of +1 will generate a CC value of 127; CV values below 0 will be clamped and generate CC values of 0.

Sending MIDI note messages



Press the 'Note' button to enable sending of MIDI note messages. Both note on and note off messages can be generated. The three drop-down menus select the behaviour of the plug-in in terms of when messages are sent.

Where a 'gate signal' is referred to below, this is taken from the CV entering the opposite plug-in channel. So for example if you're using the plug-in's left channel to generate MIDI note messages, its gate signal is taken from the CV input to the right channel, and vice versa.

The gate signal is described as being either 'open' or 'closed'. It is open when its value exceeds the value set by the 'Threshold' knob.

The 'Note On' menu selects between the following options for sending note on messages:

- Continuous - a new note on message is sent whenever the incoming CV changes enough to select a new note number (this is analogous to how CC messages are generated, as described above).
- Gate Only - a new note message is sent when the gate signal changes from closed to open.
- Gated - notes are sent as in Continuous mode, but only when the gate signal is open.

The 'Note Off' menu selects between the following options for sending note off messages:

- None - no note off messages are sent.
- Normal - a note off message is sent for the preceding note immediately before any new note on message.
- Legato - a note off message is sent for the preceding note immediately after any new note on message.

The 'Gate Close' menu selects what message is sent when the gate signal goes from open to closed. The options are:

- None - the closing gate does not cause any message to be sent.
- Note Off - the closing gate causes a note off message to be sent for the preceding note.

The 'Length' control allows you to set a maximum length (in milliseconds) for any note. When this is set to a value other than 'Off', a note off message will be generated for the preceding note on message after the specified time, if one has not already been generated e.g. by the closing gate.

The 'Centre' and 'Slope' controls relate the incoming CVs to the generated MIDI note numbers. 'Centre' sets the note number when the incoming CV is zero; 'Slope' controls the rate of change of note number with CV. So for example with the default setting of Centre = 48 & Slope = 48, a CV of -1 gives note number 0, a CV of 0 gives note number 48, and a CV of +1 gives note number 96. If we set Centre = 60 & Slope = 40, then CVs of -1, 0 and +1 gives notes numbers of 20, 60 & 100 respectively.

Silent Way CV To OSC



Introduction

Silent Way CV To OSC translates CV signals (such as those produced by Silent Way CV Input, for example) into OSC messages. These can in turn be used to control all sorts of software and hardware devices. See the Expert Sleepers YouTube channel for some ideas.

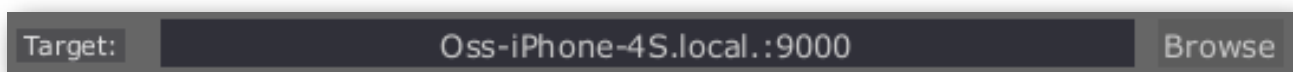
If you're unfamiliar with OSC, start by visiting opensoundcontrol.org.

Silent Way CV To OSC operates as a stereo or mono plug-in. In stereo mode, the two channels are independent and have identical controls. In mono mode, the 'Right Channel' controls are not used.

Setup

Once you have your CVs entering the plug-in (a simple matter of audio routing) there are two things you will need to set up: the Target and the OSC Paths.

Target

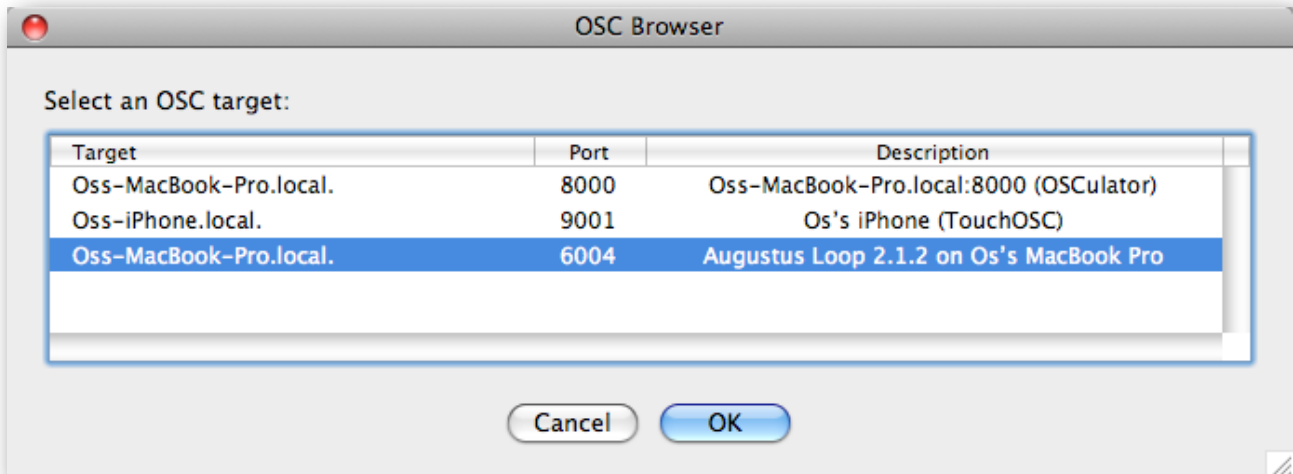


The field along the bottom of the plug-in GUI shows its Target address - a combination of machine name and port number that identifies the device or software on the network to which the OSC messages will be sent.

You can use either a numeric IP address (e.g. 127.0.0.1) or a hostname (e.g. localhost) to identify the host. This should be followed by a colon (':') and then the port number.

Browsing for Targets (OS X only)

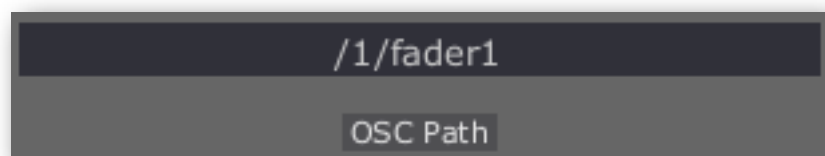
To the right of the Target field is a button labelled 'Browse'. Clicking this brings up a dialog which lists all the OSC services on the network that are advertising themselves via



'Bonjour'. Simply click on the service you want from the list and click OK - this will set up the target name and port for you.

OSC Paths

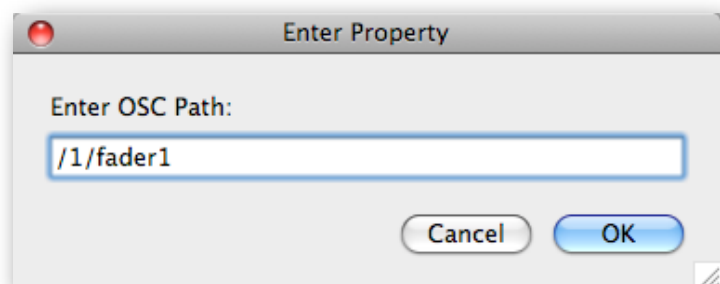
OSC messages begin with a 'path', which is simply a short section of text that gives meaning to the message, as understood by the target.



The format of the path is arbitrary. The path in the example image ("/1/fader1") is in the format used by the popular iPhone application 'TouchOSC', and addresses the first fader on the first page of controls in that app.

The full message as sent by Silent Way CV To OSC is the path followed by a floating point number, the number representing the CV voltage.

To set the path, click the box. A dialog will appear into which you can type your desired path.



Other Controls

The two channels have a small number of other controls in addition to the OSC Path.

Enable

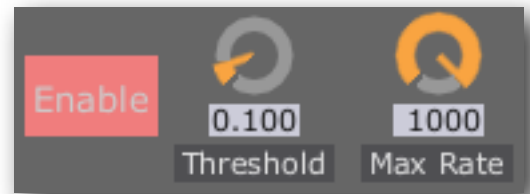
The 'Enable' button simply enables that channel for producing OSC messages. By default it is off, so you'll want to turn it on to see anything happen.

Threshold

The 'Threshold' control sets a limit below which a change in CV will not emit a new OSC message. Think of it like a noise gate in the audio world.

Max Rate

The 'Max Rate' control sets an upper limit on how frequently OSC messages can be emitted by the plug-in. Depending on your application you may find that quite low settings are perfectly adequate. Lowering the Max Rate may reduce the load on your computer, the network and the target device.



Silent Way DC



Introduction

Silent Way DC is a simple plug-in that generates constant output signals. It is intended to be used in conjunction with parameter automation (via MIDI or directly by the host application) to generate varying signals. For example, you could use it as an LFO where you draw out the LFO waveform in your host's parameter automation GUI.

It operates as a stereo or mono plug-in. In stereo mode, the two channels are independent and have identical controls. In mono mode, the 'Right Channel' controls are not used.

NB in Logic, if you're not passing a signal through the plug-in, you need to load it on an instrument channel via the 'AU Generators' menu.

Left/Right Channel

There are six knobs per channel.

Out 0->1

Sets the output level between zero and one. This is most useful for generating positive-only voltages for e.g. gates.

Out -1->1

Sets the output level between minus one and one. This is useful for generating the full range of negative and positive voltages for controlling e.g. oscillator pitch.

If both 'Out 0->1' and 'Out -1->1' are used, the output is simply the sum of the two settings.

Multiplier

Scales the values set by the two 'Out' knobs. This can be useful if you've set up a pattern you like automating the Out knobs and you just want to scale the overall output level.

Input Add

Sets the level of the input to the plug-in that is added in to the output signal.

Input Mult

Sets the amount by which the input signal is used to multiply the output signal. At a setting of zero, the output is unaffected by the input. At a setting of one, the output is exactly the normal output multiplied by the input signal.

Smooth

Applies one of two forms of smoothing to the output signal. This can be useful when the very sudden changes in level that are possible in the digital domain cause clicks and pops in your analogue gear.

Positive values apply slew rate limiting i.e. a limit is placed on how fast the output signal can change. Signals changing slower than this rate are unaffected.

Negative values apply a simple low-pass filter to the signal. This has some affect on all signals, whether they're changing slowly or not.

In both cases, the values are given in milliseconds (ms). The time set is the time taken for a full range voltage swing from -1.0 to +1.0.

Silent Way ES-4 Controller



Introduction

The Silent Way ES-4 Controller plug-in is a special element of the Silent Way plug-in suite, dedicated to controlling the [Expert Sleepers ES-4](#) and [ES-40](#) modules.

Unlike most of the rest of the Silent Way plug-ins, the ES-4 Controller does not time out, allowing unrestricted use without a Silent Way licence. However, some advanced features of the ES-4 Controller are only available to owners of a active licence.

The ES-4 Controller offers:

- Two MIDI/CV channels, offering the features of a standard MIDI/CV converter, driving the ES-4's two pitch outputs (1 & 2).
- Controls that directly set the exact output signal of the ES-4's five channels.
- MIDI note on/off control over the 40 possible gate outputs.
- A MIDI out generator, allowing an ES-4 Gate Expander output to be used as a MIDI output, transmitting all the usual MIDI messages, including MIDI clock.
- Inputs for routing generic CV sources (e.g. other Silent Way plug-ins) or audio to the ES-4's outputs (requires a Silent Way licence).

A note on MIDI channels

The ES-4 Controller packs a lot of functionality into one plug-in, and to address all of that functionality via MIDI, the various blocks of the plug-in let you choose which MIDI channel they respond to.

However, not all DAWs pass MIDI to plug-ins on multiple MIDI channels. Ableton Live, for example, always passes MIDI to plug-ins on channel 1, no matter what the MIDI channel of the messages arriving into Live itself.

The exact implications of this will vary from DAW to DAW, but it's worth bearing in mind, if things don't appear to be working as you expect.

Gate Expander outputs

A number of the plug-in's controls let you choose ES-4 Gate Expander (aka ESX-8GT) outputs. These are listed as a pair of numbers e.g. "1/6" is gate 6 on the Gate Expander connected to the ES-4's channel 1; "5/2" is gate 2 on the Gate Expander connected to the ES-4's channel 5.

MIDI/CV 1/2

These two groups of controls provide functionality similar to that of a traditional standalone MIDI/CV converter, for each of the ES-4's pitch CV outputs (outputs 1 & 2).



Channel

Specifies the MIDI channel that the converter responds to, or 'Off' to disable the converter completely.

Min & Max

Specify the range of MIDI notes that the converter responds to. This lets you set up a keyboard split, using the two converters on the same MIDI channel.

Gate

Specifies the ES-4 output to use for the gate signal (an on/off CV signal reflecting whether a note is held or not). You can choose any of the ES-4's 5 outputs, or one of the 40 possible Gate Expander outputs. Setting this to 'Off' disables the gate signal.

Vel

Specifies the ES-4 output to use for the velocity signal (a CV reflecting the velocity of the MIDI note being played). You can choose any of the ES-4's 5 outputs. Setting this to 'Off' disables the velocity signal.

Priority

Sets the note priority mode. Since the ES-4 Controller behaves as a monophonic synth, a scheme is required to determine which note sounds when multiple keys are held at the same time. The options are:

- Newest - the most recently pressed key sounds.
- Lowest - the lowest note sounds.
- Highest - the highest note sounds.

Outputs

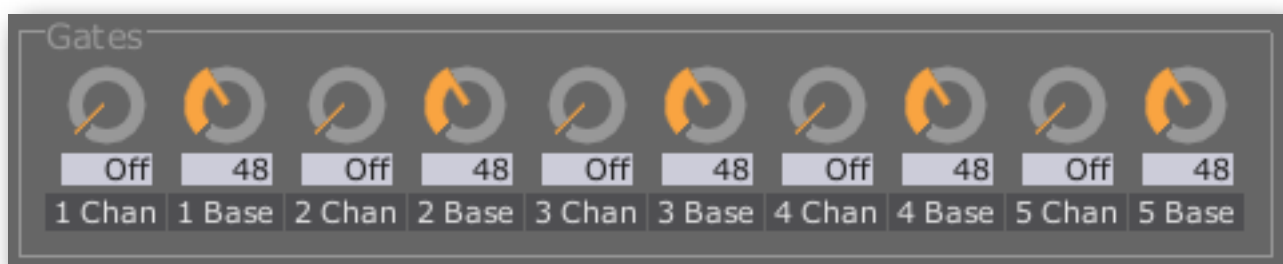
These controls let you directly set the output levels of the ES-4's 5 outputs. The values range from 0 to 255 (an 8 bit value).

These can be particularly useful when combined with MIDI controller mapping in your DAW to, say, map a synth mod wheel to a CV output for filter cutoff. Via OSC or MIDI, you have the possibility to control the ES-4 and/or the Gate Expanders down to the individual bit (i.e. gate).



Gates

This section offers MIDI note on/off control over the 40 gate outputs from the ES-4 Gate Expanders.



There is a pair of controls for each of the ES-4's 5 channels i.e. the 5 possible Gate Expanders. "Channel" sets the MIDI channel to respond to, or "Off". "Base" sets the base note to respond to, which will control the Gate Expander's output 1. The remaining 7 outputs will be controlled by the 7 MIDI notes above the base note e.g. if the base note is 48, outputs 1 to 8 on the Gate Expander will be controlled by notes 48 to 55.

There is a demo video of this [here](#)¹.

Triggers/Accents

The 'Triggers' button exposes 2 new sections of controls.

Triggers

The 'Triggers' controls allow each of the 40 possible gate outputs above to be used as a trigger instead i.e. a short pulse is emitted at each MIDI note on, and note offs are ignored.

Each trigger length control sets the trigger time, in milliseconds, or 'Off' to allow normal gate functionality.



Accents

The 'Accents' controls allow each even numbered gate output to be used as a velocity-switched 'accent' output for the gate output immediately below it. This is typically useful with drum synths which have both a trigger input and an accent input e.g. the [Tip-Top Audio](#)² 808 range of modules. There is a demo video of this [here](#)³.



When a gate output is enabled as an accent, it will be activated by the note for the gate below when the note's velocity is at or above 64 (mid-range). Note that it retains its own separate 'Trigger' control (above), and can still be activated by its own MIDI note.

As a concrete example: in the image above, Accent 1/4 is enabled, meaning gate output 4 on channel 1. This makes output 4 an accent output for output 3. When output 3 is activated by a MIDI note, if the note's velocity is 64 or more, then output 4 will be activated simultaneously.

¹ <http://vimeo.com/30015330>

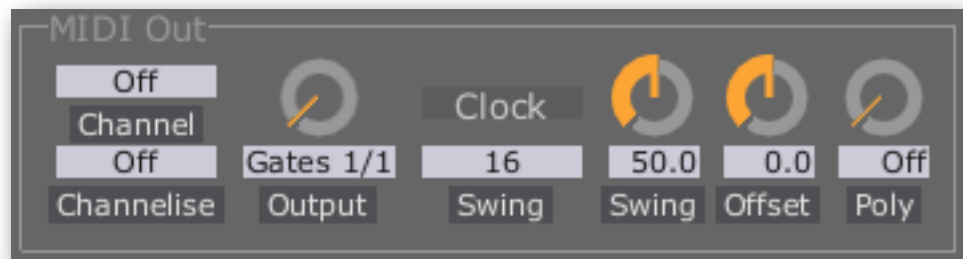
² <http://www.tiptopaudio.com/>

³ <http://vimeo.com/38096483>

MIDI Out

This section allows a Gate Expander output to be used as a MIDI output. Because the ES-4's outputs are derived from an audio signal, the MIDI mes-

sages sent from an ES-4 are free from the [timing problems](#) often associated with regular (e.g. USB) MIDI interfaces.



Note: The MIDI out feature is fully supported when the input sample rate is 48kHz or above. In particular, it may not work reliably at 44.1kHz, though users have reported that most hardware does actually work fine when receiving MIDI generated by an ES-4 running at 44.1kHz.

Channel

Specifies the MIDI channel to receive on. All MIDI messages from this channel are echoed out to the ES-4's output. "Off" disables this feature (but not the MIDI clock output, if enabled). "Omni" receives messages on all MIDI channels.

Channelise

If set to "Off", MIDI messages are sent out on the same channel on which they are received. If set to a channel number (1-16), the incoming MIDI messages are sent out on the specified channel.

Output

Selects the Gate Expander output that will carry the MIDI signal.

Clock

If enabled, causes the plug-in to send MIDI timing clock messages, synced to the DAW's transport.

When Clock is enabled, MIDI clock is generated when the host DAW's transport is running. The MIDI clock generation always begins at the start of a bar; if the host transport is started in the middle of a bar, the plug-in waits for the next bar before starting the MIDI clock.

Swing

These controls allow you to add 'shuffle' or 'swing' timing to the clock output.

Swing has two controls. The knob sets the amount of swing, in percent. 50% means no swing (the middle sixteenth note is 50% of the way between the neighbouring notes, as normal). Higher values of swing make the middle note later; lower values make it earlier. At 100%, the middle note is right on top of the following note.

The dropdown menu chooses between sixteenth and eighth note swing.

Offset

The Offset control applies a small delay or advance in the timing of the MIDI clock, relative to the host's transport. This can be used to compensate for any difference in the response time of the hardware being synced.

Poly


When set to something other than 'Off', the Poly control enables the plug-in's polyphonic MIDI splitting mode.

Normally, the plug-in simply echoes all the MIDI it receives to the chosen expander output. In polyphonic mode, the plug-in interprets MIDI note on/off messages and distributes them amongst the chosen number of expander outputs. (The outputs used are the one chosen by the 'Output' knob and those that follow it sequentially. So for example if Output is set to 'Gates 2/1' and Poly is set to 3, then the outputs used are expander 2 outputs 1, 2 and 3.) This allows you to connect a number of monophonic synthesizers and play them as a single polysynth.

Non-note data (e.g. pitch bend, CCs) are echoed to all the poly outputs. In particular, MIDI clock is output to all the poly outputs, which makes for a handy way to send MIDI clock to a number of MIDI devices from a single plug-in, even if you don't actually want to play them as a polysynth.

Output Indicators

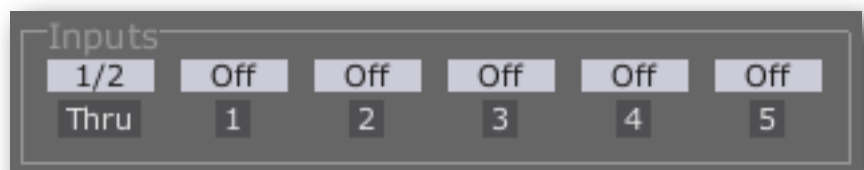
The row of numbers just above the 'Triggers' button show the values currently being output on the 5 ES-4 output channels.



64	0	0	0	0
----	---	---	---	---

Inputs

This section controls the routing of other signals into the plug-in and on to the ES-4.



The plug-in has 8 inputs, organised as 4 stereo pairs. Quite how this is handled by the DAW will vary considerably

from DAW to DAW. Some DAWs are very flexible (e.g. Ableton Live) while some make it very hard to route audio into such a plug-in (e.g. Logic Pro). If your DAW of choice is lacking in this regard, we recommend the use of Plogue Bidule, which provides a very flexible and modular plug-in environment, and can itself be used as a plug-in within the DAW.

Each menu in this section lets you choose from the available input channels, or set the connection to 'Off'.

Thru

The 'Thru' input connection is designed to allow multiple ES-4 Controllers to be 'stacked', their outputs being combined in a logical manner. By default the Thru connection is taken from the first stereo pair of inputs, which is what will be connected if you simply insert a sequence of ES-4 Controller plug-ins on the same track in your DAW.

This is how you would, for example, use multiple ES-4 Controllers to generate multiple streams of output MIDI (using the MIDI Out section, above).

This is also useful when you want to use the two MIDI/CV outputs on separate MIDI channels and the DAW doesn't provide a way to send two MIDI channels to one ES-4 Controller. Stack two instances of the plug-in, use MIDI/CV 1 on one instance and MIDI/CV 2 on the other, and then send your two MIDI streams to the two plug-ins.

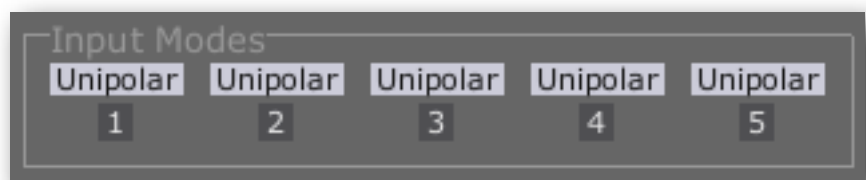
1-5

Note: the use of inputs 1-5 requires a full Silent Way licence. Without a licence, the inputs will work for 15 minutes and then time out.

These inputs simply route audio (or CVs) from the selected plug-in input to the relevant ES-4 output. This is how you would, for example, use the Silent Way LFO plug-in to send LFO signals out of the ES-4.

Input Modes

These menus work in conjunction with the input 1-5 options above, and define how the incoming audio/CV stream is mapped onto the ES-4's output range.



'Unipolar' means that positive inputs from 0.0 to 1.0 will be mapped to the ES-4's output range (0 to 255). Negative inputs will be clamped at zero.

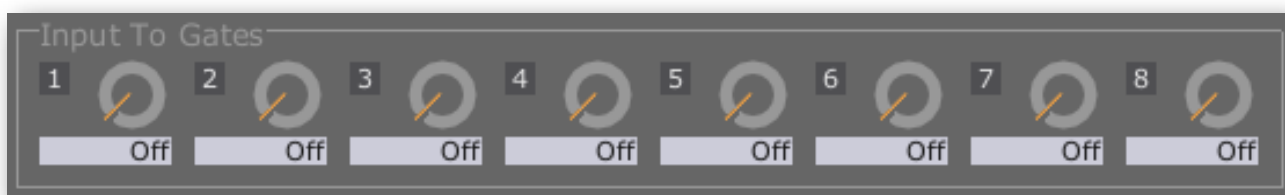
'Bipolar' means that inputs from -1.0 to 1.0 will be mapped to the ES-4's output range, with 0.0 being mapped to a mid-scale output on the ES-4 (128).

To some extent these settings will want to match the ES-4's jumper settings, but this is by no means a necessity.

For sending audio to the ES-4, it is recommended to use an input set to Bipolar, and with an ES-4 channel with the jumper in the bipolar ($\pm 5V$) setting. For CVs, use whatever works well for you.

Input To Gates

The controls in the 'Input To Gates' section allow you to route signals at the ES-4 Controller's inputs to Gate Expander outputs. This is useful when using e.g. the [Step LFO](#) as a step sequencer, and one of its channels is being used as a simple gate to trigger notes.

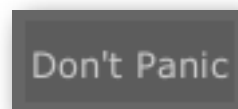


Each of the plug-in's eight inputs has a knob allowing you to choose a destination gate output, or 'Off' to disable the function on that input. The gate will be turned on whenever the input signal is above zero.

Panic Button

The button marked "Don't Panic" has the same effect as if the plug-in received a MIDI "All Sound Off" message on every MIDI channel. That is:

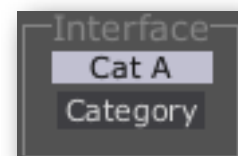
- notes stop sounding on any active MIDI/CV channels
- all gates close on active gate channels
- All Sound Off messages are sent to the MIDI output, if in use.



Interface Category

The Interface Category drop-down menu allows you to inform the plug-in of what kind of audio interface will be outputting the plug-in's signal. Please refer to

<http://expert-sleepers.co.uk/siwacategories.html>



for more details - the specifics are likely to be more fluid than should be put here in the user manual.

Silent Way ES-5 Controller



Introduction

The Silent Way ES-5 Controller plug-in is a special element of the Silent Way plug-in suite, dedicated to controlling the [Expert Sleepers ES-5](#) module. Unlike most of the rest of the Silent Way plug-ins, the ES-5 Controller does not time out, allowing unrestricted use without a Silent Way licence.

In Use

All the controls of the ES-5 Controller work in exactly the same way as the similarly-named controls in the [ES-4 Controller](#), except that where the ES-4 has 5 channels, the ES-5 has 6. So there are 6 Output knobs, 6 pairs of knobs in the Gates section, and the controls which specify a gate output go up to “6/8” instead of “5/8”. Please refer to the ES-4 Controller documentation above for a detailed description of each function.

The outputs on the ES-5 module itself are on channel 1 i.e. gates “1/1” to “1/8”.

Silent Way ESX-4CV Combiner



Introduction

The Silent Way ESX-4CV Combiner plug-in is a special element of the Silent Way plug-in suite, dedicated to controlling the [Expert Sleepers ESX-4CV](#) module. Unlike most of the rest of the Silent Way plug-ins, the ESX-4CV Combiner does not time out, allowing unrestricted use without a Silent Way licence.

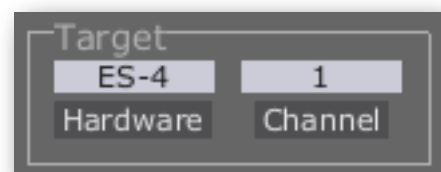
In Use

The ESX-4CV Combiner is a 6-in, 2-out plug-in. Typically 4 of those inputs will carry signals to be sent to the ESX-4CV's four outputs, and 2 inputs will be a "Thru" connection, carrying signals for the other channels of the ES-4 or ES-5 to which the ESX-4CV is connected.

Target

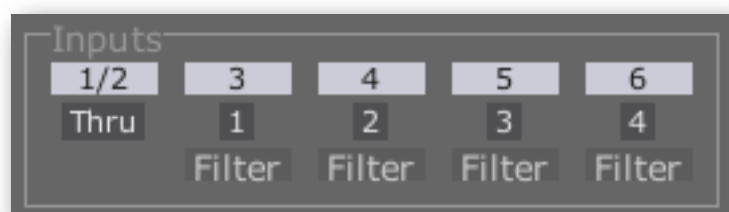
The "Target" section is where you let the plug-in know how the ESX-4CV is physically connected to your system.

The "Hardware" drop-down lets you select between ES-4 and ES-5. The "Channel" drop-down sets the channel on the ES-4/5 to which the ESX-4CV is connected.



Inputs

The "Inputs" section sets up the routing from the plug-in inputs to the hardware outputs. Each control may be set to "Off" which disables that input.



The “Thru” input chooses a stereo pair of inputs which will receive a signal from another Silent Way plug-in which is outputting a signal for the ES-4/5 e.g. from the ES-4 Controller, from Silent Way Sync (in ES-4 mode) or from the Voice Controller (in ES-4 mode). Use this input to stack plug-ins on a single track to address multiple ES-4/5/expanders at the same time.

The drop-downs labelled “1” to “4” choose a plug-in input that will be routed to the corresponding output of the ESX-4CV.

Offset

The “Offsets” controls let you dial in a voltage offset on each ESX-4CV output. The values on the controls are in Volts.



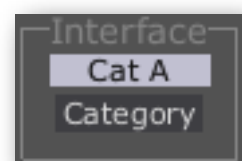
SMUX Proof

The ‘SMUX Proof’ button modifies the output of the plug-in to be compatible with the [Silent Way SMUX](#) plug-in. It should be activated whenever the SW ESX-4CV Combiner’s output is being passed through the SW SMUX plug-in, typically when running at double sample rates (88.2/96kHz) with an Expert Sleepers ES-3 module.



Interface Category

The Interface Category drop-down menu allows you to inform the plug-in of what kind of audio interface will be outputting the plug-in’s signal. Please refer to



<http://expert-sleepers.co.uk/siwacategories.html>

for more details - the specifics are likely to be more fluid than should be put here in the user manual.

Silent Way ESX-8CV Combiner



Introduction

The Silent Way ESX-8CV Combiner plug-in is a special element of the Silent Way plug-in suite, dedicated to controlling the [Expert Sleepers ESX-8CV](#) module. Unlike most of the rest of the Silent Way plug-ins, the ESX-8CV Combiner does not time out, allowing unrestricted use without a Silent Way licence.

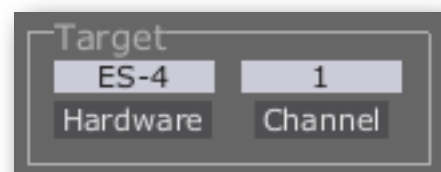
In Use

The ESX-8CV Combiner is a 10-in, 2-out plug-in. Typically 8 of those inputs will carry signals to be sent to the ESX-8CV's four outputs, and 2 inputs will be a "Thru" connection, carrying signals for the other channels of the ES-4 or ES-5 to which the ESX-8CV is connected.

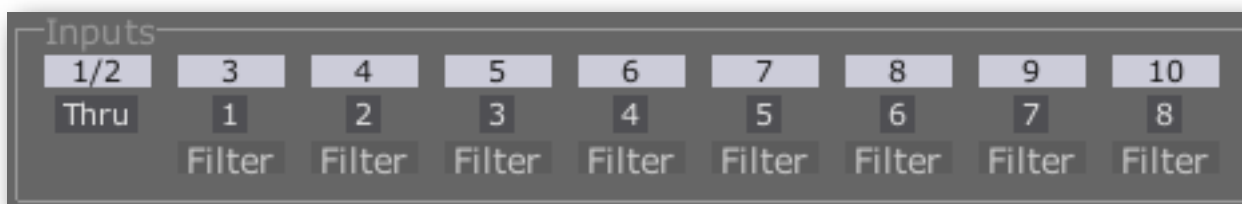
Target

The "Target" section is where you let the plug-in know how the ESX-8CV is physically connected to your system.

The "Hardware" drop-down lets you select between ES-4 and ES-5. The "Channel" drop-down sets the channel on the ES-4/5 to which the ESX-8CV is connected.



Inputs



The “Inputs” section sets up the routing from the plug-in inputs to the hardware outputs. Each control may be set to “Off” which disables that input.

The “Thru” input chooses a stereo pair of inputs which will receive a signal from another Silent Way plug-in which is outputting a signal for the ES-4/5 e.g. from the ES-4 Controller, from Silent Way Sync (in ES-4 mode) or from the Voice Controller (in ES-4 mode). Use this input to stack plug-ins on a single track to address multiple ES-4/5/expanders at the same time.

The drop-downs labelled “1” to “8” choose a plug-in input that will be routed to the corresponding output of the ESX-8CV.

Offset



The “Offsets” controls let you dial in a voltage offset on each ESX-8CV output. The values on the controls are in Volts (assuming the ESX-8CV’s jumper is not fitted, and the calibration trimmer is at the factory default setting).

SMUX Proof

The ‘SMUX Proof’ button modifies the output of the plug-in to be compatible with the [Silent Way SMUX](#) plug-in. It should be activated whenever the SW ESX-8CV Combiner’s output is being passed through the SW SMUX plug-in, typically when running at double sample rates (88.2/96kHz) with an Expert Sleepers ES-3 module.

A rectangular button with the text 'SMUX Proof' in a light grey font on a dark grey background.

Adaptive Mode

The 'Adaptive Mode' button controls whether the plug-in will update all eight of the hardware outputs continuously (non-adaptive mode), or only those outputs that are changing (adaptive mode). In general the best performance will be in adaptive mode, unless you want the precise timing of the output updates to be predictable, in which case you may prefer non-adaptive mode.

A rectangular button with a red background and the text "Adaptive Mode" in white.

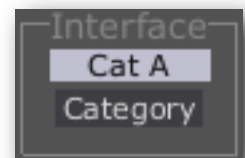
As an example, assume that the system is running at a sample rate of 48kHz. In non-adaptive mode, each output is continuously updated in turn, and each update takes three samples. So, 24 samples are required to update all eight outputs, and so each output effectively runs at 2kHz.

In adaptive mode, the update rate depends on the number of channels that are changing. (Note, 'unchanging' here means exactly that - an input does not need to be set to 'Off' to be unchanging. The output from Silent Way LFO in square wave mode, for example, only changes twice per LFO cycle, and the rest of the time is unchanging for the purposes of the ESX-8CV's adaptive mode.) Each output update again takes 3 cycles, so if only one output of the ESX-8CV is changing, its update rate will be 16kHz. If two outputs are changing, they will be updated at 8kHz, and so on, down to 2kHz (as in non-adaptive mode) for eight outputs all changing all the time.

Interface Category

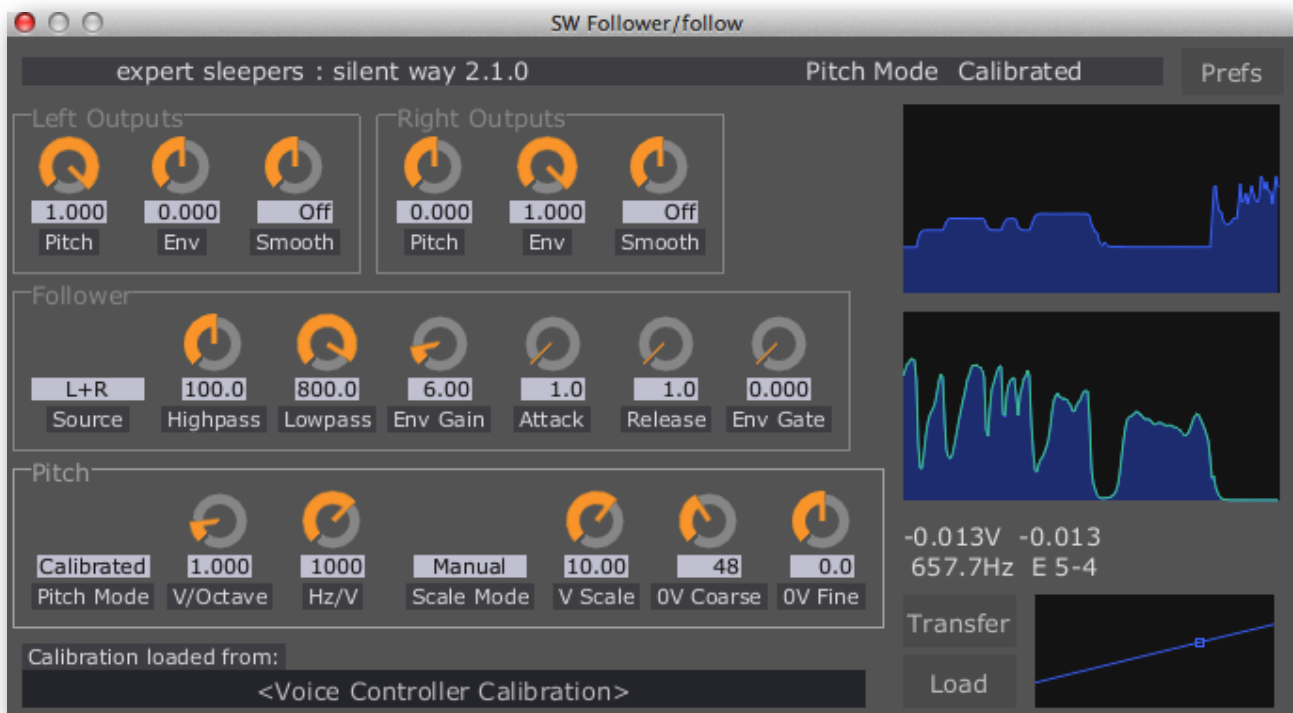
The Interface Category drop-down menu allows you to inform the plug-in of what kind of audio interface will be outputting the plug-in's signal. Please refer to

<http://expert-sleepers.co.uk/siwacategories.html>



for more details - the specifics are likely to be more fluid than should be put here in the user manual.

Silent Way Follower



Introduction

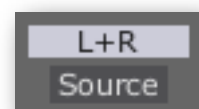
Silent Way Follower tracks the pitch and envelope of incoming audio, and outputs pitch and envelope CVs accordingly.

Follower

The “Follower” section defines some basic parameters of the pitch and envelope detection processes.

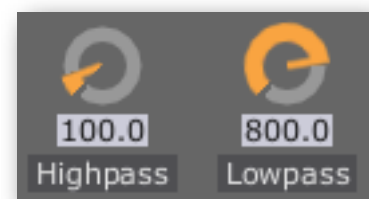
Source

The “Source” drop-down sets whether the plug-in operates on its left input, its right input, or a sum of the two (“L+R”).



Input Filters

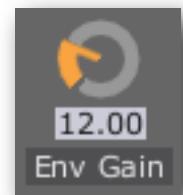
The “Highpass” and “Lowpass” knobs control two simple filters that are applied to the audio before the detection takes place. Typically you would adjust these to filter out any signal outside of the base pitch you’re trying to detect, to avoid the pitch detector locking onto any overtones or noise elements. E.g if you know you’re trying to track a bass part in the octave



from 200-400Hz, adjusting the filters to 200Hz and 400Hz or thereabouts might help the detection process.

Env Gain

The “Env Gain” knob is a simple gain control on the signal, provided as a convenience to get the envelope CV into a healthy range.



Env Attack and Release

The “Env Attack” and “Env Release” knobs define time constants for the maximum rate of change of the envelope CV.



Env Gate

The “Env Gate” knob sets a threshold on the envelope level, below which the envelope CV goes to zero. This can be useful if the input signal is a little noisy, to cut off the envelope between notes.



Pitch

The “Pitch” section controls how the detected pitch is transformed into a CV.

Pitch Mode

This drop-down sets whether the plug-in generates a Volt/Octave (linear) pitch CV or a Hertz/Volt (exponential) pitch CV, or whether it uses a calibration profile from the [Voice Controller](#).

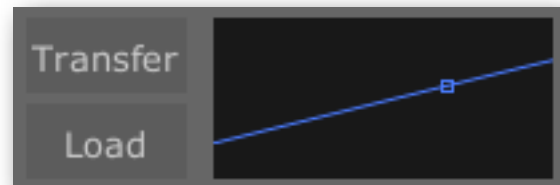
The knobs to the right of the Pitch Mode control define the selected response.



If “V/Octave” is selected as the Pitch Mode, then the “V/Octave” knob defines the number of Volts Per Octave (usually 1.0, but e.g. the Buchla standard is 1.2).

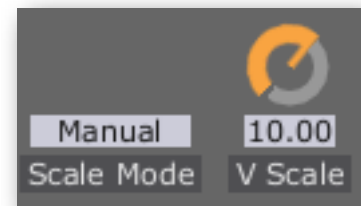
If “Hz/V” is selected as the Pitch Mode, then the “Hz/V” knob defines the number of Hertz Per Volt (there’s no real standard in this case).

If “Calibrated” is selected as the Pitch Mode, neither of these two knobs is used. Instead, a calibration profile generated by the Voice Controller plug-in is used to determine the relationship between tracked frequency and output voltage. The “Load” button is used to load a calibration file saved from the Voice Controller. The “Transfer” button transfers the calibration directly from the last-calibrated Voice Controller (without the need to save the calibration file to disk).



Pitch Scale

After the Pitch Mode controls have set the desired voltage response, the two Scale controls set how this maps to an output level from the hardware. Note that these controls are not used when the Pitch Mode is set to “Calibrated”.



The “Scale Mode” drop-down has three options: “Manual”, “ES-4” and “ESX-4CV”.

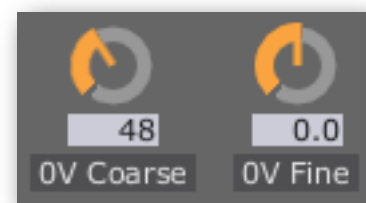
If the Scale Mode is Manual, then the “V Scale” knob is used to tell the plug-in the full-scale output voltage of the hardware. (The default value of 10.0 is approximately correct for the Expert Sleepers ES-3 module.)

In “ES-4” or “ESX-4CV” mode the plug-in uses a scaling appropriate to the module in question (so you can for example feed the output of the Follower directly into an ESX-4CV Combiner and get a correctly calibrated pitch CV from an ESX-4CV module).

0V

The final two knobs in this section set what pitch is considered to be at zero volts. The coarse knob sets this in MIDI note numbers (so a change of 1 means a change of one semitone); the fine knob sets this in cents. The two are simply added.

In “Calibrated” Pitch Mode these controls are effectively a transpose control.



Outputs

Each output (left and right) has a group of controls which define how the pitch and envelope CVs are finally output by the plug-in.

The “Pitch” and “Env” knobs are simple mixer controls, defining how much of each signal leaves by the output in question. The “Smooth” knob is the same as in many other Silent Way plug-ins (described [above](#)).



Graphical Displays

At the right side of the plug-in GUI are two graphs, showing how the detected pitch and envelope are changing over time. (Note that the graphs show the pitch and envelope signals, not the left and right outputs of the plug-in, though by default these are equivalent.)

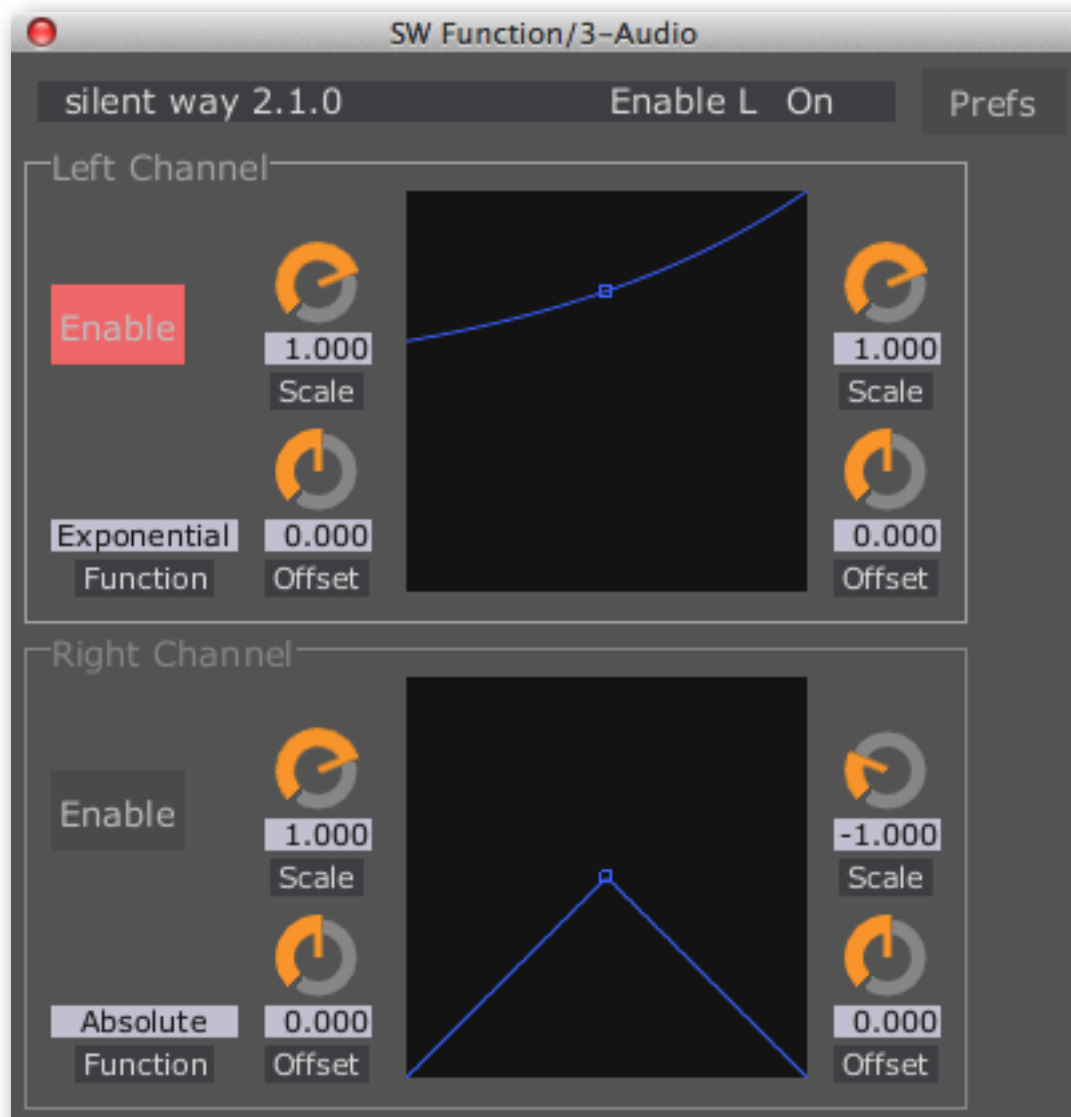
The top graph shows the pitch; the bottom graph shows the envelope. For the envelope, the green line shows the detected envelope, and the blue filled-in graph behind shows the output envelope CV after the Attack and Release settings have been taken into account.

Below the graphs is a numeric readout. This only appears when an envelope above zero is detected (else it would show garbage, since pitch detection can't operate without a signal). It is coloured red when the detection fails (which usually means that the input has descended into noise, or has dropped below the minimum tracking frequency). The numbers are:

A screenshot of the numeric readout area. It displays two rows of data. The top row shows '1.221V' and '0.122'. The bottom row shows '305.3Hz' and 'D#4-33'.

- in the top row: the desired voltage, and the normalized (0-1) plug-in output level.
- in the bottom row: the detected pitch, in Hz, and as a musical note plus detune in cents.

Silent Way Function



Introduction

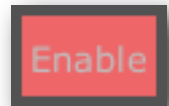
Silent Way Function applies simple mathematical operations to incoming CVs.

It is intended to be primarily useful for processing CVs entering the computer via [Silent Way CV Input](#) or directly from an Expert Sleepers [ES-6](#) or [ES-7](#) module, in ways that are hard to implement in hardware, making the computer itself a useful utility module in a modular system. However, you can (ab)use it however you wish; you can feed audio through it if you like extreme waveshaping effects.

It operates as a stereo or mono plug-in. In stereo mode, the two channels are independent and have identical controls. In mono mode, the 'Right Channel' controls are not used.

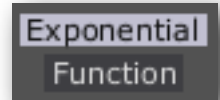
Enable

The 'Enable' button activates processing on the relevant channel. If the channel is not enabled, signals pass through it unmodified.



Function

The 'Function' drop-down menu allows you to choose the function that will be applied to the incoming signal. The options are:

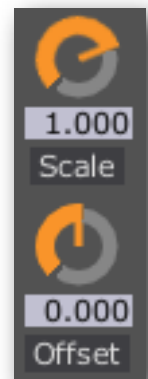


- Linear - a simple linear function. If no scale and offset are applied (see below) this doesn't modify the signal at all.
- Logarithm - the output is 1.0 plus the logarithm (to base 2) of the input. The output is zero for negative inputs.
- Exponential - the output is the exponential (to base 2) of the input minus 1.0.
- Absolute - the output is the absolute value of the input.

Scale and Offset

The 'Scale' and 'Offset' knobs apply scale (multiplication by a value) and offset (addition/subtraction of a value) before and after the function chosen.

The input scale and offset knobs are to the left of the graph; the output scale and offset knobs are to the right.



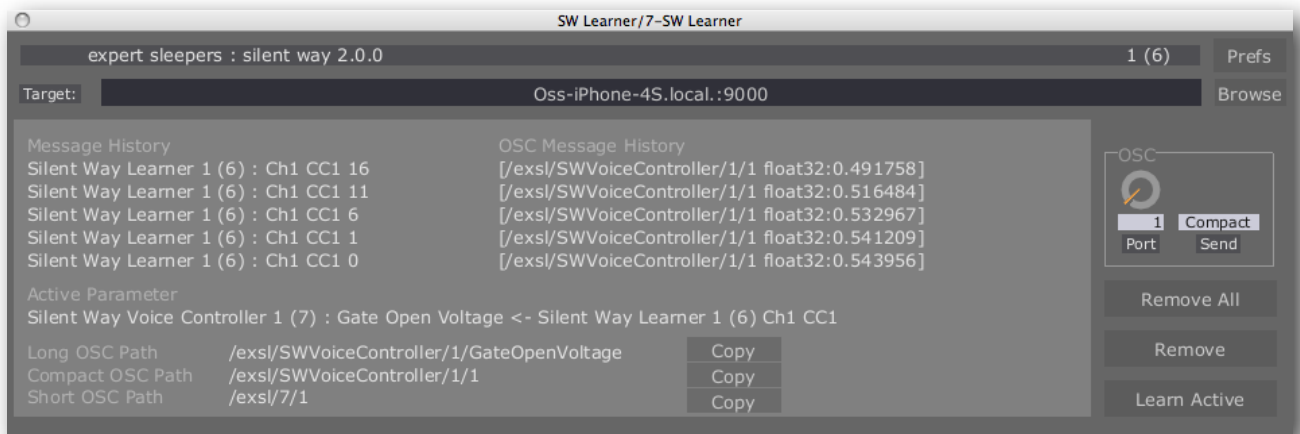
Graph

The display in the centre of the plug-in UI shows the chosen function as a graph. The input is on the 'x' (horizontal) axis and the output on the 'y' (vertical) axis.

A small moving indicator on the graph shows the current input and output values.

The output scale and offset knobs modify the graph to show their effect. The input scale and offset knobs do not modify the appearance of the graph, but you can see their effect on the movement of the indicator.

Silent Way Learner



Introduction

Silent Way Learner is the hub for controlling the Silent Way plug-ins from the outside world - specifically, via MIDI and via OSC.

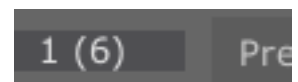
MIDI is passed to the plug-ins by the host application/DAW. Using the Learner, MIDI can be sent to any or all plug-ins and used to control the receiving plug-in or any other, greatly simplifying the task of getting MIDI from your MIDI controller to the plug-in you want to control.

OSC (Open Sound Control) is received by the Learner directly, from another application on the same computer, or over the network (e.g. from your iPhone). If you've not come across OSC before, you could start by visiting opensoundcontrol.org

UIDs

Since the Learner centrally controls all the plug-ins running in a host, it needs a way of referring to them. It does this with UIDs (Unique IDentifiers), which are just numbers. Each plug-in has two - a GUID (Global UID) and a LUID (Local UID). A plug-in's GUI is unique amongst all the Silent Way plug-ins loaded; its LUID is unique only amongst plug-ins of the same type (e.g. all the Voice Controllers).

The UIDs are displayed in the bar at the top of each plug-in GUI (but only if the Learner is loaded). The first number is the LUID; the second number (in brackets) is the GUID.



MIDI Mapping

Silent Way Learner implements a "MIDI learn" system for setting up associations between incoming MIDI and the parameters to be controlled.

First, click the parameter you want to control in the plug-in UI. This will be reflected in the Learner display, under “Active Parameter”.

Active Parameter
Silent Way Voice Controller 1 (7) : Gate Open Voltage

Now, click the “Learn Active” button in the Learner.

Learn Active

The Learner is now listening for MIDI messages. Any Silent Way plug-in in your setup can receive MIDI, including the Learner itself. When it finds a message it can use, the Learner automatically maps it to the active parameter, and the parameter is now controlled by that MIDI message.

Remember to turn off “Learn Active” when you’re done, or you’ll find yourself setting up all kind of MIDI mappings unintentionally.

Any MIDI mapping on the active parameter is displayed in the Learner after the parameter name, followed by a “<-” (an arrow).

tag <- Silent Way Learner 1 (6) Ch1 CC1

To remove a MIDI mapping, activate the parameter and click the “Remove” button in the Learner. There is also a “Remove All” button, which clears out all MIDI mappings currently set up by the Learner - use with care!

Remove All

Remove

Supported MIDI Messages

Currently MIDI continuous controller (CC) and polyphonic pressure (PP) messages are supported by the Learner. It is anticipated that this will be expanded on in a future update.

MIDI Message History

The Learner shows the last five MIDI messages received in its GUI (most recent at the bottom). Note that it only shows messages that are supported for MIDI mapping.

Each line shows the plug-in that received the message, the MIDI channel, the type of message (e.g. CC), and further type-specific information (e.g. the CC number and value).

Message History

Silent Way Learner 1 (6) : Ch1 CC1 16
Silent Way Learner 1 (6) : Ch1 CC1 11
Silent Way Learner 1 (6) : Ch1 CC1 6
Silent Way Learner 1 (6) : Ch1 CC1 1
Silent Way Learner 1 (6) : Ch1 CC1 0

OSC Control

Silent Way defines a unique and consistently-formed OSC path for every parameter in every plug-in loaded in your setup. This makes it straightforward to create templates for control of Silent Way in popular OSC-sending apps such as [TouchOSC](#)¹ and [Lemur](#)².

There is a demo video of Silent Way Learner's OSC capabilities [here](#)³.

Parameter Paths

Long OSC Path	/exsl/SWVoiceController/1/GateOpenVoltage
Compact OSC Path	/exsl/SWVoiceController/1/1
Short OSC Path	/exsl/7/1

Each parameter's path can be written in three different ways:

- Long: /exsl/<plug-in name>/<LUID>/<parameter name>
- Compact: /exsl/<plug-in name>/<LUID>/<parameter id>
- Short: /exsl/<GUID>/<parameter id>

Which you use is very much up to you. The advantage of using LUIDs is that the TouchOSC (or whatever) templates you make are likely to be more re-usable - a template set up to address "SWVoiceController/1" will always be useful for the first Voice Controller in any setup, whereas using its GUID ("7" in the screenshot above) is likely to target an entirely different plug-in in a different song.

The Learner shows all three forms of the path for a parameter whenever you click on the parameter's control in a plug-in UI. Each path has a 'copy' button to its right, clicking which will copy the path into the system clipboard. This makes it very straightforward to set up controller templates if the controlling app has an editor which runs on the same computer - simply click the knob you want to control with OSC, copy its path from the Learner and paste it into the editor.

Activating OSC

OSC is enabled by setting the "Port" control in the Learner to something other than "Off".

The actual port on which the Learner listens is defined by the sum of the Port setting in the UI and the "Port Offset" as set in the [Prefs](#). E.g. if the Offset is set



¹ <http://hexler.net/software/touchosc>

² <http://liine.net/en/products/lemur/>

³ <http://vimeo.com/46715640>

to 7000 (the default) and the Port is set to 1, then the plug-in listens on port 7001.

Setting up the controlling device

The device/application sending OSC to the Learner needs to know the computer's IP address, and the port as defined above. How you enter that information depends on the sender. For example, [this page](#)¹ describes the setup in TouchOSC on iPhone.

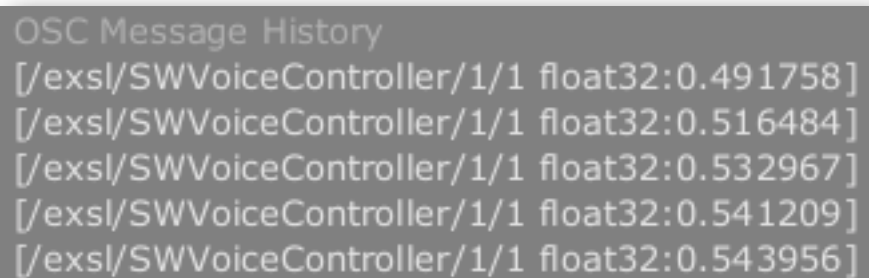
On Mac OS X only, Silent Way Learner supports 'Bonjour' (aka ZeroConf). When OSC is activated, it advertises itself on the network so that apps can browse for it and set up the connection with a single click. This is the preferred setup method with TouchOSC.

Setting up controllers

The controlling app should be set up to send the parameter paths as defined above, followed by a single floating point number, which is the value to which to set the parameter.

OSC Message History

The Learner shows the last five OSC messages received in its GUI (most recent at the bottom). All messages received are shown, even those not recognised by the Learner (though note that /t3d messages for the [Sound-plane](#) are not shown).



```
OSC Message History
[/exsl/SWVoiceController/1/1 float32:0.491758]
[/exsl/SWVoiceController/1/1 float32:0.516484]
[/exsl/SWVoiceController/1/1 float32:0.532967]
[/exsl/SWVoiceController/1/1 float32:0.541209]
[/exsl/SWVoiceController/1/1 float32:0.543956]
```

Each line shows the OSC path, followed by the list of parameters in the OSC message. Each parameter is preceded by its type (e.g. 'float32').

Sending OSC

Silent Way Learner can also send OSC whenever parameters are changed, allowing for bidirectional communication with a remote device.



To enable this, set the "Send" drop-down to something other than "Off". The options are Long, Compact and Short - choose the one that corresponds to the form of the OSC path you want to send. Note that for bidirectional control, this should correspond to the form of the path that the remote device is sending to the Learner.

¹ <http://hexler.net/docs/touchosc-configuration-connections-osc>

You also need to tell the Learner the IP address and port of the remote device/app. This is done in the same way as in the CV To OSC plug-in, [above](#). Again, Bonjour is supported on Mac OS X only.

Advanced Usage

There are some special OSC paths that you can form, beyond the basic single parameter control already described.

Wildcards

In the Long and Compact path forms, the LUID can be "*" (an asterisk) instead of a number, in which case the message controls the parameter on all plug-ins of the same type.

Multiple parameters per message

This is useful when you have a multidimensional controller e.g. TouchOSC's x/y pad.

To form a path suitable for this control, you can simply concatenate the paths of the two parameters, omitting the second "/exsl". So for example

```
/exsl/SWDC/1/0/SWDC/1/5
```

controls parameters 0 and 5 (Output Positive L and Output Positive R) on Silent Way DC (LUID 1). This path would then be followed by 2 floating point numbers.

Multi-element controls

A special form of path is supported for controls which have multiple sub-elements, for example TouchOSC's "multifader". Such controls append a number to the end of the OSC path to specify which sub-element is being controlled.

The path in this case for use with Silent Way Learner is e.g.

```
/exsl/+multi1/SWStepLFO/1/Step1L
```

that is, the regular path for the parameter with the modifier "+multi1" inserted. The actual paths sent by TouchOSC in this case will be e.g.

```
/exsl/+multi1/SWStepLFO/1/Step1L/1  
/exsl/+multi1/SWStepLFO/1/Step1L/2  
etc.
```

The Learner takes the number at the end and adds it (less one) to the parameter id. So in this case the multifader will control Step1L, Step2L, Step3L etc.

Silent Way LFO



Introduction

Silent Way LFO, as its name suggests, is intended as a low frequency oscillator, performing the same functions as LFOs in any other synth e.g. vibrato, filter cut-off modulation, auto-pan effects etc.

It operates as a stereo or mono plug-in. In stereo mode, the two channels are independent (except in 'Quadrature' mode - see below) and have identical controls. In mono mode, the 'Right Channel' controls are not used.

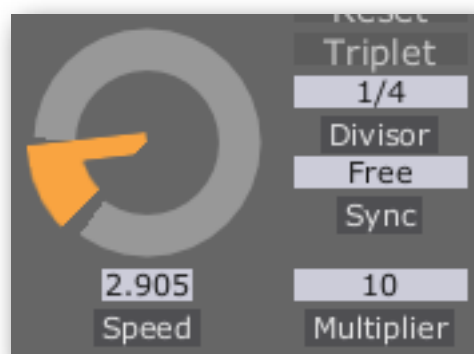
Any input signal to the plug-in is combined into its outputs, according to the setting of the Input Mode control (see below). It is therefore easy, for example, to apply an LFO to the pitch CV output of the [Voice Controller](#) plug-in by simply inserting the LFO plug-in on the same channel as (and after) the Voice Controller. However an input signal is not required, and the LFO will quite happily do its job without any input connection.

NB in Logic, if you're not passing a signal through the plug-in, you need to load it on an instrument channel via the 'AU Generators' menu.

Speed Controls

Two controls set the basic frequency of the LFO - the large 'Speed' knob on the left and the 'Multiplier' drop-down beside it.

The Speed knob sets the LFO frequency in Hz (cycles per second). The Multiplier drop-down lets you choose a number by which the frequency is multiplied. The options are 0.1, 1, 10 and 100. So for example if the Speed knob is set to 5Hz and the Multiplier is set to 100, the actual frequency of the LFO will be 500Hz.

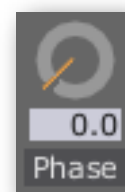


Sync Controls

The other large knob, labelled 'Beats', and the controls above the Multiplier drop-down together provide another way to specify the LFO frequency, based on the tempo of the song as specified by the plug-in's host application.

There are five options for the 'Sync' drop-down:

- **Free** - The frequency is set by the Speed knob, as previously described.
 - **Tempo** - The frequency is set by the 'Beats' knob, the 'Divisor' drop-down and the 'Triplet' button.
 - **Transport** - As Tempo, but additionally the phase of the LFO is locked to the host transport (so e.g. the start of the LFO cycle is locked to the start of the bar). The 'Phase' knob lets you set a constant offset for the LFO cycle as against the transport cycle that it's locked to.
 - **Quadrature** - The LFO is locked to the other LFO, but with a phase offset determined by the Phase knob. For possible applications of this mode, see for example the Doepfer A-143-9 module ([here](#)).
- Note that the effect of the 'Phase' knob is not reflected in the graphical waveform display (see below).
- **Start/Stop** - In this mode the LFO is no longer really an LFO. Its output is controlled by whether the host's transport is playing or stopped. The actual levels generated are set as if the start/stop signal were a very slow square wave i.e. you should set a non-zero value for the 'Square' mix control (see below).
 - **Transport2** - As Transport, but the LFO stops when the host transport stops.



In Tempo and Transport modes, the Divisor sets the base unit for the sync calculation e.g. '1/4' indicates quarter notes. If the Triplet button is pressed, the Divisor is converted to its triplet equivalent. The Beats setting then multiplies the length of the note set by the divi-

sor. So for example if the Divisor is 1/8 and the Beats is 3.0, the cycle length of the LFO will be three eighth notes. If the Divisor is 1/1 and the Beats is 4.0, the cycle length will be four bars.

Note that while the Beats control only takes integer values when adjusted with the knob it is perfectly happy to be set to arbitrary non-integer values e.g. by typing in a value in the text field, or by setting a value via parameter automation/MIDI/OSC.

Mix Controls

The top row of smaller knobs controls the amount of various waveforms that are combined to create the output LFO signal. Note that the effective output waveform is displayed graphically in the area to the right of the knobs.



Sine, Triangle, Saw and Square are common waveforms and behave as you'd expect.

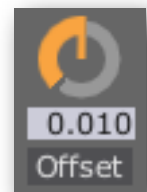
The pulse width of the Square waveform is controllable via the 'PW' control.

The 'Random' knob introduces random variations into the output signal. A new random level is generated once per LFO cycle. (This behaviour is typical of hardware 'sample+hold' circuits in combination with a noise input.)



The 'Noise' knob introduces white noise into the output.

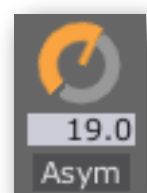
The 'Offset' control applies a constant offset to the output waveform. In terms of the graphical waveform display, you'll see that this knob simply moves the whole waveform up and down. A typical use for this would be if you wanted to generate a clock signal, rather than an LFO signal *per se*, and the connected equipment expected the clock signal to range from 0V to a maximum voltage, rather than varying between negative and positive voltages (as is typical for a regular LFO).



The 'Smooth' control has the same effect as that in the DC plug-in (see [above](#)).

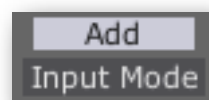
Asymmetry

The 'Asym' (short for 'asymmetry') control effectively moves the centre point of the waveform forwards and backwards in time. It is somewhat like applying a pulse width variation to a square wave, but applies equally to all the waveforms. Its effect is easy to understand if you turn the knob and watch the waveform in the graphical display.



Input Mode

The 'Input Mode' drop-down controls how the plug-in's inputs are combined with the LFO signal. The options are:



- **Add** - the LFO signal is added to the input signal. A typical use for this would be to modulate an incoming pitch CV.
- **Multiply** - the LFO signal is multiplied with the input signal. If for example the input signal is an envelope CV, this gives the effect of the LFO depth being modulated by the envelope. A common use for this would be to achieve a vibrato that fades up after the start of each note.
- **Combine** - effectively the first two options added together. In the example of the input signal being an envelope, this gives you the basic envelope shape plus LFO modulation, but the LFO is only heard when the envelope is non-zero.

Swing

The 'Swing' controls adjust the timing of the LFO in a manner similar to the swing options found in many sequencer applications.



Essentially, every other sixteenth or eighth note is pushed back slightly, changing the feel of a straight pattern to the 'dum de dum de dum' feel of a triplet pattern. Of course, the LFO is not dealing in discrete notes, so in the LFO's case the effect is more that the time within pairs of sixteenth (or eighth) notes is warped. But the effect is the same.

There's a video on the Expert Sleepers YouTube channel which might make this clearer.

A particularly important application of swing is when the LFO is actually generating a clock signal, for example to sync an external sequencer to the computer. Then applying swing in the LFO can give you the swing effect on your externally sequenced pattern, which is not something that's usually otherwise possible. Again, check the Expert Sleepers website for an example of this being applied to a TB-303 bassline.

Swing has two controls. The knob sets the amount of swing, in percent. 50% means no swing (the middle sixteenth note is 50% of the way between the neighbouring notes, as normal). Higher values of swing make the middle note later; lower values make it earlier. At 100%, the middle note is right on top of the following note.

The dropdown menu to the right of the knob chooses between sixteenth and eighth note swing.

NB The swing effect only applies when the host's transport is playing.

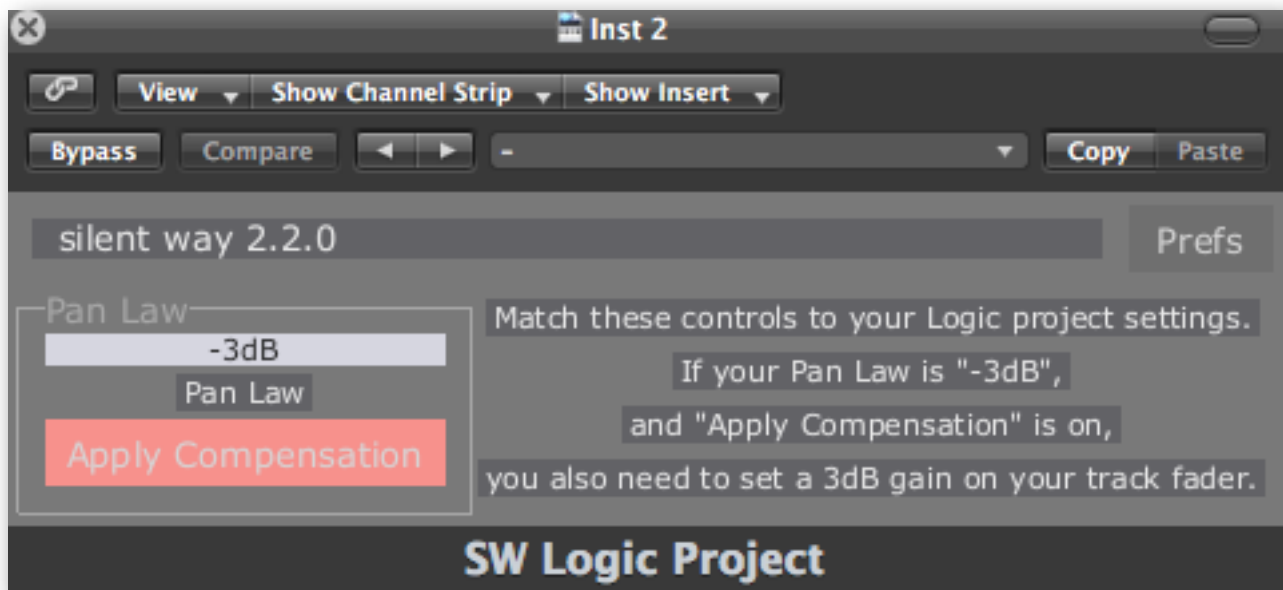
Reset By Note

The 'Reset' button, when enabled, causes the LFO to retrigger (i.e. start from the beginning of its waveform) whenever the plug-in receives a MIDI note-on message. This is useful when you effectively want to use the LFO as a complex and looping envelope generator, instead of a traditional free-running LFO.



The 'Phase' button sets the point in the waveform that the LFO jumps to when reset by a MIDI note.

Silent Way Logic Project

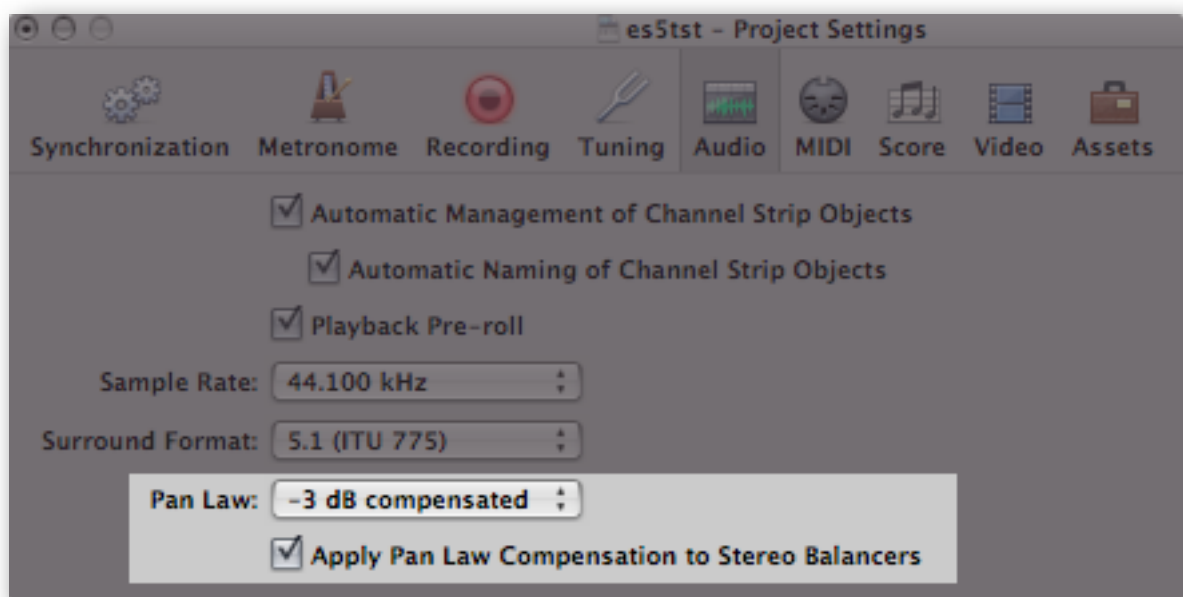


Introduction

Silent Way Logic Project is a utility plug-in that is only useful when used with Apple Logic Pro. It allows Silent Way to adapt to certain Logic project settings that affect Silent Way's behaviour.

Usage

Logic has project settings for 'Pan Law' and 'Apply Pan Law Compensation to Stereo Balancers'.



If 'Apply...' is on, Silent Way needs to know about these settings so it can adjust its output

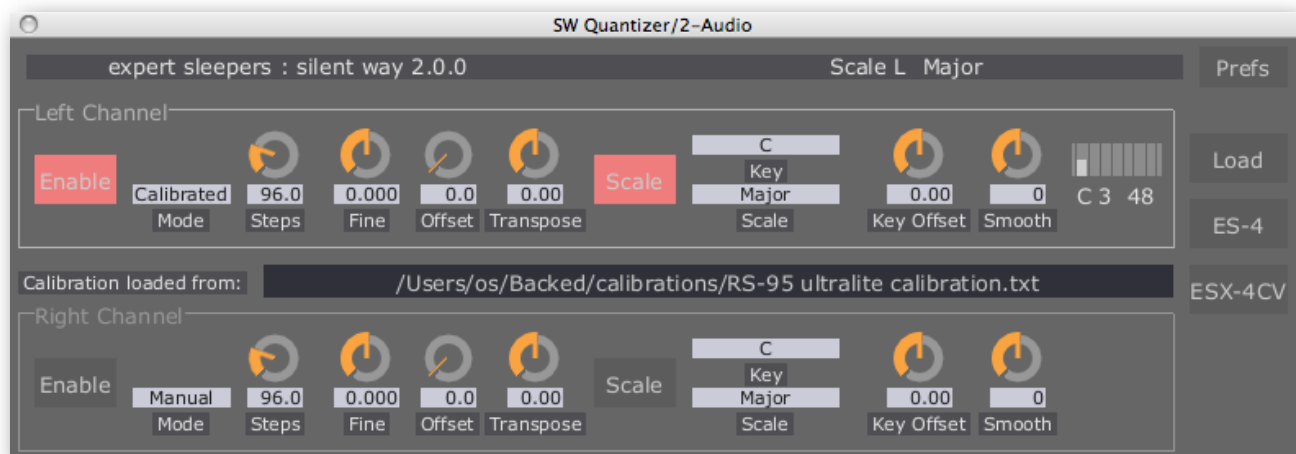
accordingly in plug-ins that control ES-4s & ES-5s. Hence the need for 'Silent Way Logic Project. This plug-in is an AU Generator and so needs to be loaded on a software instrument track in Logic. The pan law settings from Logic should be replicated in the SW Logic Project plug-in's GUI.

Silent Way Logic Project itself outputs no signal, and so its track needs no particular routing. In fact the track and even the plug-in can be safely deactivated - it just needs to be present in the project.

Further relevant information can be found on this web page:

<http://expert-sleepers.co.uk/siwacategories.html>

Silent Way Quantizer



Introduction

Silent Way Quantizer is a CV processing plug-in that constrains the incoming (continuous) CVs to a number of discrete values. For example, it can constrain a pitch CV to exact semi-tone values. This is especially useful when combined with the [Step LFO](#) plug-in in order to accurately sequence musical notes, but it can also be used with e.g. the regular [LFO](#) plug-in, or with the [Voice Controller](#) plug-in to turn portamentos into discrete glissandos.

The Quantizer plug-in is capable of loading the calibration data from the Voice Controller plug-in, in order to output accurately calibrated pitches. It can also restrict the output notes to those in musical scales (e.g. major, minor, pentatonic).

It operates as a stereo or mono plug-in. In stereo mode, the two channels are independent and have identical controls. In mono mode, the 'Right Channel' controls are not used.

Loading Calibration Data

The 'Load' button is used to load a calibration data file saved from the Voice Controller, as described [below](#). The same data is used for both Left and Right Channels of the Quantizer plug-in.

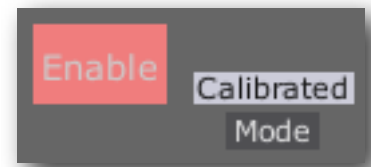


The name of the last loaded calibration file is shown for reference, across the middle of the UI. Please note that the calibration data itself is saved as part of the plug-in preset, not just a reference to the external file. In other words, once you've loaded the calibration into the plug-in, you can delete the calibration file and the plug-in will continue to use the data. Also note that if you replace the calibration file on disk, the new content of the file is not reloaded by the plug-in. The only time that the plug-in's calibration data changes is when you explicitly load a file via the plug-in's UI.

In Use

A video demonstrating the various plug-in parameters is available on the Expert Sleepers YouTube channel [here](#). As in the video, using an oscilloscope can help in visualising the effect of the controls.

The 'Enable' button enables quantisation on the channel in question - if the channel is not enabled, CVs pass through unchanged.



The 'Mode' drop-down menu selects between 'Manual' and 'Calibrated' modes, as described below.

Manual Mode

In manual mode the full incoming CV range from -1 to +1 is divided into a number of equal steps.

The 'Steps' control sets the number of steps that the -1 to +1 range is divided into. The 'Fine' control is added to the Steps control to allow finer adjustments.



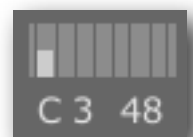
The 'Offset' control sets where within a step the zero line sits - refer to the video as mentioned above for clarification.

The 'Transpose' control shifts the chosen step up or down by a number of steps.

Calibrated Mode

Be sure to load calibration data as described above before trying to use Calibrated mode.

In Calibrated mode, the output CV exactly adopts one of the values from the calibration file. If the file was generated from a successful calibration in the Voice Controller, then this results in the Quantizer plug-in generating CVs that exactly correspond to semitone values. As noted above, this is very useful in conjunction with the Step LFO plug-in. A graphical display appears in the GUI showing the current output as a musical note and MIDI note number.



In this mode, the 'Transpose' control shifts the output CV up or down a number of steps (or semitones, if using suitable calibration data).

Using Scales

When in Calibrated mode, you can also activate the 'Scale' button to restrict the notes produced to musical scales.

The 'Key' and 'Key Offset' controls together determine the root note of the scale. They are simply added - the idea being to make it easier to automate variations around a root key.



The 'Scale' menu determines the nature of the scale used e.g. Major, Minor, Pentatonic.

Note that in Scale mode, the Transpose control actually transposes up and down within the scale - so for a normal major scale, a Transpose value of +7 will transpose up by an octave. If you want to chromatically transpose the result of the Scale quantization, use another instance of Silent Way Quantizer applied after the first.

Smooth

The 'Smooth' control has the same effect as that in the DC plug-in (see [above](#)).

Using the Quantizer with the Step LFO

As already mentioned the Quantizer in Calibrated mode is particularly useful in conjunction with the Step LFO. This involves a small amount of setup - an example is given below.

Say we want to use the Step LFO to sequence notes over a two octave range. First load up the Step LFO plug-in, and immediately follow it with a Quantizer plug-in. Load calibration data into the Quantizer, and set it to Calibrated mode. Start the host transport running.

The LFO will be outputting its default zero value. The Quantizer should be quantising this to a note. Make a note of the quantised note number - for this example, say it's C3 (48) which is what my Analogue Systems RS95 outputs for 0V.

Now, set the LFO sequence length to 1, and drag up the step in the plug-in GUI to its maximum value of +1. The pitch will most likely go very high, and the Quantizer's range exceeded. Now, adjust the LFO's Multiplier control down until the pitch as shown in the Quantizer is an octave above the 0V pitch (so C4 (60) in this example).

You can now set up the LFO's sequence however you would normally, and all its output notes will be quantised to a semitone value in a two octave range by the Quantizer.

Using the Quantizer with the Expert Sleepers ES-4

The 'ES-4' button replaces the loaded calibration (if any) with one perfectly tuned for the Expert Sleepers ES-4 module, assuming the ES-4's factory calibration. The output of the Quantizer can then be passed to the [ES-4 Controller](#) plug-in, to be routed in turn to the ES-4's channel 1 or 2.



And with the Expert Sleepers ESX-4CV

The 'ESX-4CV' button replaces the loaded calibration (if any) with one perfectly tuned for the Expert Sleepers ESX-4CV module, assuming the ESX-4CV's factory calibration. The output of the Quantizer can then be passed to the [ESX-4CV Combiner](#) plug-in.



Silent Way SMUX



Introduction

Silent Way SMUX provides a hack to workaround the reduction in channel count over ADAT connections when running the audio system at 88.1/96kHz.

When using an audio interface to produce your CVs that is connected via ADAT (for example, the Expert Sleepers [ES-3 Lightpipe/CV Interface](#)), and when the audio system is being run at a 'double speed' rate (typically 96kHz), the number of audio channels that can be sent down the ADAT connection is reduced from the usual 8 down to 4. The 4 double-speed channels are multiplexed onto the 8 ADAT channels - this system is usually referred to as 'S/MUX', or sample multiplexing.

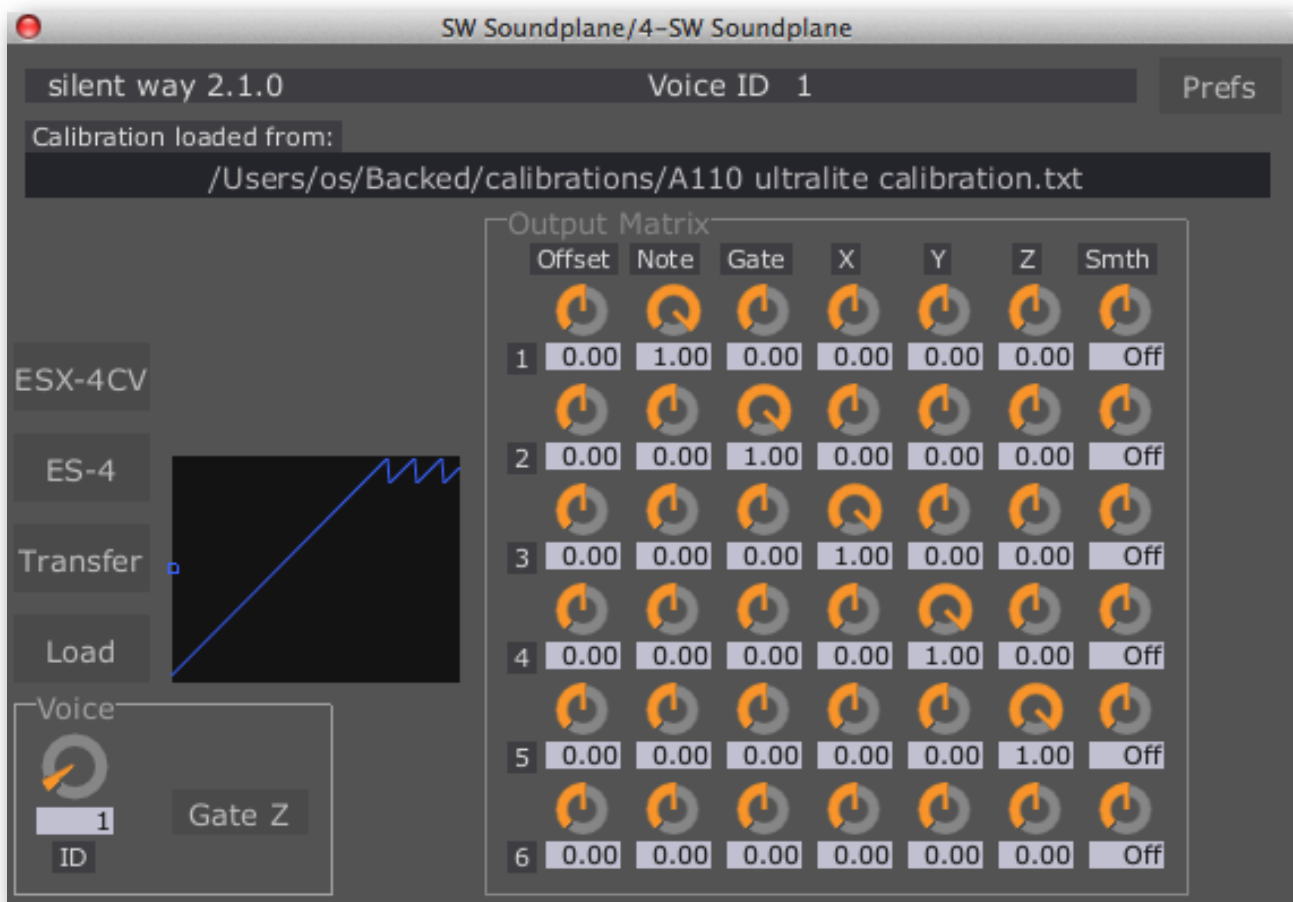
The Silent Way SMUX plug-in gets around this reduction in channel count by providing a complementary multiplexing scheme, which takes 4 channels of CVs and combines them onto 2 channels of the double-speed audio stream. When the ADAT output is then decoded by a normal-speed interface (such as the ES-3 mentioned above), the channels are demultiplexed, and so you get your 4 channels of CV back again.

In Use

The plug-in provides 4 inputs (2 stereo busses) and 2 outputs (1 stereo bus). Simply load the plug-in on a stereo channel in your DAW and route the 4 CVs to be multiplexed into the plug-in's inputs. Quite how you do this depends on your DAW. For example, in Ableton Live this can be accomplished by setting the output of a CV-generating track to point to the plug-in's inputs. In Logic, you would use a side-chain.

The plug-in only has two controls - 'Flip L' and 'Flip R'. These flip the order of multiplexing of the channels onto the output stream. Unfortunately it is quite random in what order the channels will go out - the plug-in does not have enough information from the host to know in what order to multiplex the samples. You have to load the plug-in and flip the channels if they're in the wrong order. Fortunately, there are only two possibilities.

Silent Way Soundplane



Introduction

Silent Way Soundplane is a plug-in dedicated to working with the Soundplane instrument by [Madrona Labs](http://madronalabs.com/)¹. There is a video demo of the Soundplane being used with Silent Way to control a modular synth [here](http://vimeo.com/48005694)².

Madrona Labs provide a client application which talks to the Soundplane itself via USB. The client then transmits MIDI and/or OSC. It is the OSC which is picked up and used by Silent Way.

Setup

Use Silent Way Learner ([above](#)) to receive the OSC messages from the Soundplane client. By default the client transmits to port 3123. If you use a different port in the Learner, use the Soundplane client's Bonjour implementation to find and connect to that port.

¹ <http://madronalabs.com/>

² <http://vimeo.com/48005694>

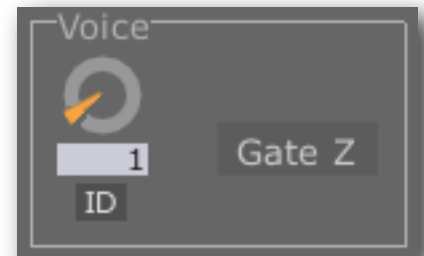
Any Silent Way Soundplane plug-in loaded now talks to the Learner behind the scenes to receive the OSC information. You need one plug-in per voice, or per touch, as the Soundplane client refers to it. Set the 'touches' control in the client to the desired number of voices and then add the same number of Silent Way Soundplane plug-ins to your setup.

Voice ID

Each plug-in is told which voice it represents with it's "ID" control. Normally you would set these to 1, 2, 3 etc. up to the number of voices in use.

Gate Z

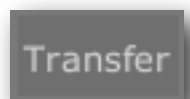
The other control in this section is a button labelled "Gate Z". If this is active, the 'z' (pressure) value will be forced to zero when the voice/touch is not active. Otherwise, the pressure output holds its last value as the touch ends.



Calibration

To output a pitch CV from the Soundplane client's note information, the Silent Way Soundplane plug-in uses a calibration profile, exactly as created and used by the Silent Way Voice Controller ([below](#)). Refer to the Voice Controller documentation for details on the calibration process.

The Soundplane plug-in also has buttons for creating preset ES-4 or ESX-4CV calibrations, again just like those in the Voice Controller. There is also a 'Transfer' button, which directly transfers the calibration from the last-calibrated Voice Controller, without the need to save and load the calibration to/from disk.



Output Matrix

Silent Way Soundplane's Output Matrix will also be familiar to users of the Voice Controller. It defines what appears at the plug-in's six outputs, by mixing together the various possible output signals.



The seven controls per row are as follows:

Offset

This is simply a constant offset. You might use it, for example, to set the centre frequency of a filter around which the other signals modulate.

Note

The Note output derives from the current pitch that is sounding, via the calibration profile.

Gate

The gate output is simply on or off, depending on whether the voice/touch is active. You might use this to drive a hardware envelope generator.

X

The raw 'x' position (left to right) of the touch.

Y

The raw 'y' position (bottom to top) of the touch.

Z

The raw 'z' position (pressure) of the touch.

Smooth

The 'Smth' control has the same effect as that in the DC plug-in (see [above](#)).

Silent Way Step LFO



Introduction

Silent Way Step LFO is a combination step sequencer and LFO generator. It shares many of the features of the [LFO](#) plug-in, but rather than generating waveforms based on simple sine, triangle etc. waves it generates a waveform that the user draws in the GUI. When the waveform is interpreted as a series of discrete values, rather than as a continuous waveform, then the output is that of a traditional analogue step sequencer. The [Quantizer](#) plug-in can be used to constrain the output values to musical notes.

It operates as a stereo or mono plug-in. In stereo mode, the two channels are independent (except in 'Quadrature' mode - see above) and have identical controls. In mono mode, the 'Right Channel' controls are not used.

Any input signal to the plug-in is combined into its outputs, according to the setting of the Input Mode control (see below). It is therefore easy, for example, to apply an LFO to the pitch CV output of the [Voice Controller](#) plug-in by simply inserting the Step LFO plug-in on the same channel as (and after) the Voice Controller. However an input signal is not required, and the Step LFO will quite happily do its job without any input connection. Incoming signals can also be used as CVs to trigger the advance and reset of the Step LFO, as can incoming MIDI.

NB in Logic, if you're not passing a signal through the plug-in, you need to load it on an instrument channel via the 'AU Generators' menu.

Silent Way Step LFO also includes a controllable randomness generator for creating evolving semi-random patterns.

In Use

The Speed, Sync, Swing, Asymmetry, Phase, Offset and Smooth controls are all the same as for the [LFO](#) plug-in. Please refer to the documentation of that plug-in above before reading on.

The 'Multiplier' knob is very much like one of the mix controls in the LFO plug-in - it simply scales the whole waveform up & down (and can invert it too).

The Sync control has two extra modes as compared to the LFO plug-in: Trig Free and Trig Tempo. In these modes the base speed of the Step LFO is as per the similarly named mode (Free or Tempo), but the LFO pauses at the end of each step until a trigger is received - see the Inputs section below for information on triggers.

UI Groups

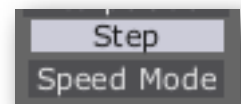
A row of buttons above the main control area switches the user interface between a number of groups of controls. 'Main' selects the primary



controls for setting the LFO speed etc. 'Inputs' shows controls relevant to the plug-in's input signals and their effect. 'Random' shows the random generator. 'Big' hides all the other controls and simply maximises the step editor, which might be useful when a high number of steps is being used, or to aid visibility in a live performance situation.

Speed Mode

The 'Speed Mode' dropdown menu sets how the LFO speed (as set by the various speed/sync controls) is interpreted for the Step LFO. The options are 'Cycle' and 'Step'.



When set to 'Cycle' the speed means the same as for the basic LFO plug-in - i.e. it defines the time taken for one full cycle of the pattern.

When set to 'Step' the speed defines the time taken for one step of the pattern.

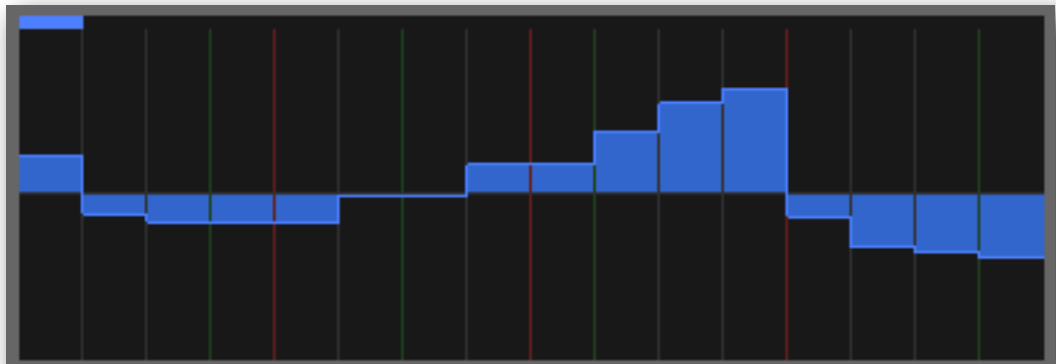
Which you use will largely depend on how you want the plug-in to react when you change the pattern length (see below). If the Speed Mode is set to Cycle, changing the number of steps will result in a different number of steps looping round in the same time. If the Speed Mode is set to Step, changing the number of steps will result in the pattern taking a longer or shorter time to loop, while the time taken on each step remains constant.

Typically you would select Cycle when using the plug-in as an LFO and Step when using it as a step sequencer, but the choice is entirely yours.

Editing the Steps/Waveform

Waveform display

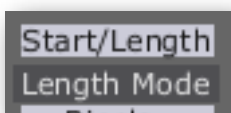
The right hand side of the GUI is where you set up the waveform that the LFO will output.



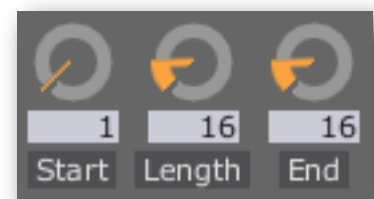
It is divided horizontally into a number of steps, each one of which can be set to a value of your choosing. Note that every fourth and every third dividing line is coloured differently, to aid in setting up patterns in standard time signatures.

Simply click and drag the mouse to set values. You can set a number of steps in a single gesture. As with knobs, holding shift while dragging allows for much finer control over the value set; also holding Command (Mac OS X)/Alt (Windows) resets the value to zero. Holding Option (Mac OS X)/Control (Windows) prevents horizontal mouse movement from moving onto another step - useful when you have a large number of steps on screen and you want to be sure you're only adjusting one of them.

Setting the pattern length



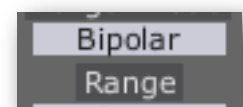
The length of the pattern is set by a combination of the 'Length Mode' dropdown menu and the three knobs labelled 'Start', 'Length' and 'End'.



The Start knob always sets the start position of the pattern; the end of the pattern is set by the Length knob if the Length Mode menu is set to 'Start/Length' and by the End knob if the Length Mode menu is set to 'Start/End'.

Range mode

The 'Range' dropdown menu lets you select between Unipolar and Bipolar operation. Unipolar signals would commonly be used for gates, or for general CVs in systems that only use positive voltages (e.g. Buchla).



Interpolation mode

The 'Interpolation' dropdown menu lets you select between Step and Linear interpolation. When set to Step, the same value is held constant throughout a step; when set to Linear, the values change in linear ramps between steps.



Note that the Smooth control offers other options for how the value changes between steps, that can be combined with either setting of the Interpolation menu.

Gate

The 'Gate' control sets the amount of each step that takes the step value; outside of this time, the step value is zero. By default the control is set to 100% - reducing this introduces 'gaps' in the waveform. This is especially useful when using one side of the Step LFO to control the gate of a voice (usually fed into the gate input of a hardware envelope generator) since it means that each step can trigger a new envelope cycle, rather than having to introduce zero values steps every other step.

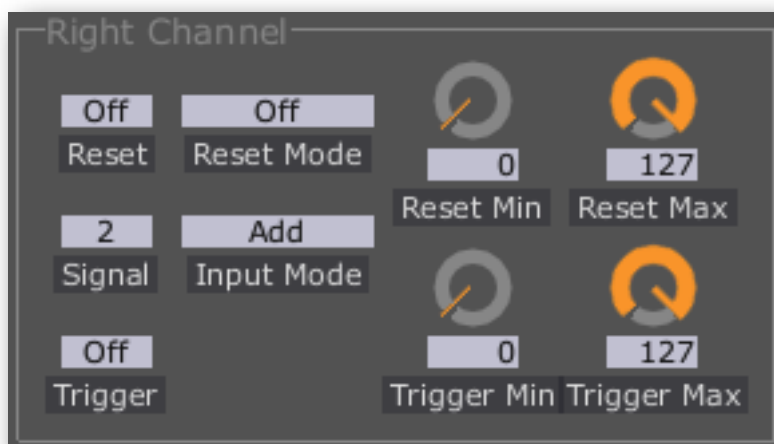


Inputs

Pressing the 'Inputs' button shows the controls that affect the plug-in's behaviour with respect to its inputs.

There are three possible destinations for input signals: Reset, Signal and Trigger.

- Reset causes the Step LFO to return to step 1 (when the signal rises above a threshold).
- Signal is the input to the plug-in to be combined with its output in exactly the same way as happens in the [LFO](#) plug-in.
- Trigger causes the Step LFO to advance one step if the Sync setting (see above) is one of the Trigger modes (when the signal rises above a threshold).



Each signal can be Off or driven from one of the plug-in's six inputs. (Note that some DAWs might make it hard or impossible to access more than two or four of these.) The input choice is set via the drop-down menus.

Reset Mode

There are four different modes of operation for the reset function (in addition to the self-explanatory 'Off').

- On - the LFO jumps to the start of step 1 immediately.
- Delayed
 - If Sync is Transport: the LFO jumps to the start of step 1 at the end of the current step. I.e. it waits for the current step to complete, and then resets.
 - If Sync is a triggered mode: the LFO jumps to the start of step 1 on the next trigger.
 - Otherwise, the same as On.
- Instant
 - If Sync is Transport: the LFO jumps to the start of step 1 immediately, but plays step 1 for a reduced time so that the transition to step 2 is still in time.
 - Otherwise, the same as On.
- Closest
 - If Sync is Transport: the LFO chooses the behaviour of either Delayed or Instant according to how far through the current step the LFO is. This is probably the mode to use if you're aiming to manually reset the LFO by e.g. hitting a key on a MIDI keyboard.
 - Otherwise, the same as On.

Input Mode

The Input Mode control is exactly the same as that described for the [LFO](#) plug-in.

MIDI Inputs

The reset and trigger functions can also be accessed via MIDI, specifically by sending MIDI Note On messages to the plug-in. The range of notes that will control each function is set by the Min/Max controls. E.g. if Trigger Min is set to 48 and Trigger Max is set to 60 then MIDI notes C3 to C4 inclusive will trigger the LFO, but notes outside of that range will not.

Random

Pressing the 'Random' button shows controls for the Step LFO's random step generator.

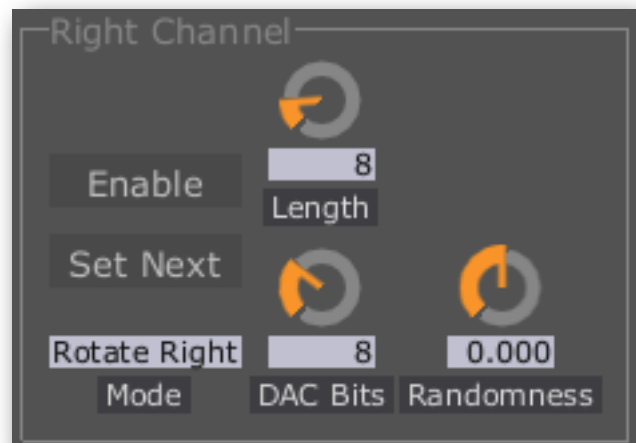
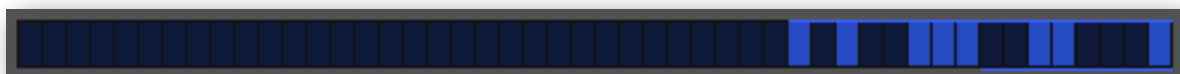
This is a software take on the popular shift-register based method of random CV generation found in a number of hardware synth modules. Google for 'random shift register cv' and you should get the idea.

The basic idea is that you have a number of binary 'bits' (often 8 or 16 in a hardware implementation) which rotate around a register (essentially a very small element of computer memory). As each bit leaves the end of the register it may or may not be inverted before it re-enters the register at the other end. The random element controls whether the bit gets inverted or not. The beauty of this scheme is that by controlling the randomness of that change (to make the inversion more or less likely) you can control whether the sequence is completely random, slowly changing, or completely static.

To turn the register full of bits into a random signal, in the hardware world a DAC (digital to analogue converter) is used. The bits are simply interpreted as a binary representation of a number (0 to 255 for an 8 bit DAC), and that is the value of the output signal takes at that time.

This being a software implementation, it can of course do things that would be hard or expensive in hardware.

The bits in the shift register are visualised in a display just above the main step editor:



Enable

The 'Enable' button turns the random generator on. When it's running, the shift register is advanced synchronously with each step of the Step LFO itself. The random value is written over the existing step value; conversely, when you disable the random generator, the random pattern remains in the step editor for possible manual tweaking.

Set Next

This control sets whether the random value replaces the step value that the LFO just stepped to, or the following step value. This makes more sense when the Interpolation mode is Linear.

Mode

There are two modes, Rotate Right and Rotate Left, which are fairly self-explanatory - they simply control in which direction the bits rotate. Because the right-most bit is always the least significant bit of the DAC, different rotation directions tend to produce different sounding patterns.

Length

The 'Length' knob sets the number of bits in the shift register, from 1 to 48.

DAC Bits

The 'DAC Bits' knob sets the number of bits that are the input to the DAC. This sets the number of possible different values that the random output can take e.g. an 8 bit DAC can output 256 different values; a 1 bit DAC can output 2 values (just on or off).

Randomness

This is the setting that is often CV-controlled in a hardware implementation, as it controls the tendency of the random pattern to evolve.

At a setting of '0.0' the chance of a bit being inverted is exactly 50%. This is maximum randomness.

At settings higher than 0.0, the chance of a bit being inverted gets gradually less, meaning the pattern tends to change less often. At a value of 1.0, the chance of a bit being inverted is zero, and the pattern is fixed.

At settings lower than 0.0, then chance of a bit being inverted gets gradually more, which again means that the pattern tends to change less often. At a value of -1.0, the bit is always inverted, which means that the pattern is fixed, and twice as long as the register length - the pattern plays alternately inverted and non-inverted.

Editing the bits with the mouse

You can directly edit the bits in the shift register by clicking with the mouse. (Clicking and dragging the mouse in the shift register has the same effect as clicking in each bit position that you drag over.)

A simple click will invert the bit under the mouse. Shift+click sets the bit (i.e. turns it on). Option (OS X)/Control (Windows)+click resets the bit (i.e. turns it off.)

Silent Way Sync



Introduction

Silent Way Sync generates regular clock pulses or triggers, and in particular can generate a [DINsync](#) signal, suitable for synchronising certain old drum machines and synths to the DAW.

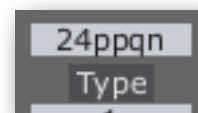
The plug-in has two outputs (both of which are optional): a clock output and a run/stop output.

In Use

When the 'Type' is set to something other than 'Off', clocks are generated when the host DAW's transport is running. Clock generation always begins at the start of a bar; if the host transport is started in the middle of a bar, the plug-in waits for the next bar before starting the clocks.

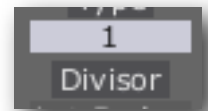
Type

- "Off" disables clock generation.
- "24ppqn" generates a 24 pulses-per-quarter-note signal, the standard used by many Roland products.
- "48ppqn" generates a 48 pulses-per-quarter-note signal, the standard used by some Korg products.
- "Custom" uses the 'PPQN' control to allow the user to specify the number of pulses per quarter note.



Divisor

However the number of pulses per quarter note is specified, the 'Divisor' control allows the rate to be halved, quartered etc.



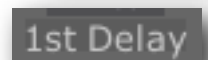
Multiplier

The reverse of Divisor, the Multiplier knob multiplies the period of the clock pulses. This is particularly useful for very slow clocks, for example, if you require a clock pulse every 16 bars to reset a sequence.



1st Delay

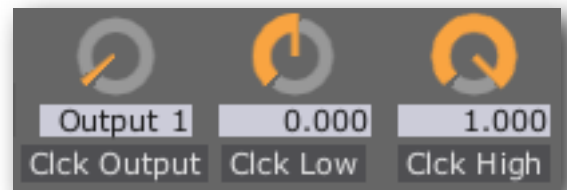
If enabled, causes the first clock pulse after transport start to be delayed slightly. This is required for accurate sync with certain drum machines (which require the first clock to arrive slightly after the run signal goes high, so it can be reliably detected), and is recommended to always be turned on when the plug-in is being used to generate actual DIN sync, rather than general purpose clocks.



Outputs

Each output (clock/run) has three controls.

The first sets which plug-in output will carry the signal in question, or "Off" if that signal is not required. Unless in ES-4 or ES-5 Mode (see below), the valid settings are "Output 1" or "Output 2", for the left and right channels of the plug-in's stereo output respectively. In ES-4 Mode, any of the ES-4's outputs or any gate output of attached ESX-8GT expanders can be selected. Likewise, in ES-5 Mode any of the ES-5's own gate outputs or that of any attached expander can be selected.



In ES-4 Mode, any of the ES-4's outputs or any gate output of attached ESX-8GT expanders can be selected. Likewise, in ES-5 Mode any of the ES-5's own gate outputs or that of any attached expander can be selected.

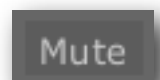
The other two output controls set the output levels used for low and high logic states.

If using the plug-in to generate DIN sync from an Expert Sleepers ES-3, setting the 'High' controls to 0.5 will generate approximately +5V, which is the nominal level of a DIN sync clock or run/stop signal. Similarly if using outputs 3, 4 or 5 of an ES-4, if those outputs are in their default unipolar configuration.

When using an ES-5 or ESX-8GT output, the signal may be inverted by setting the 'low' value higher than the 'high' value.

Mute Clocks

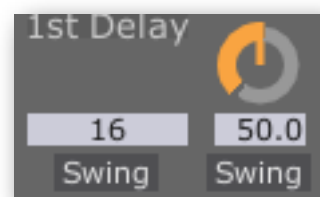
The 'Mute' button forces the clock output to its 'low' value.



Swing

These controls allow you to add 'shuffle' or 'swing' timing to the clock output.

Swing has two controls. The knob sets the amount of swing, in percent. 50% means no swing (the middle sixteenth note is 50% of the way between the neighbouring notes, as normal). Higher values of swing make the middle note later; lower values make it earlier. At 100%, the middle note is right on top of the following note.



The dropdown menu chooses between sixteenth and eighth note swing.

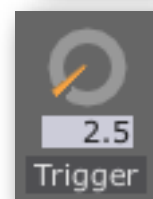
Offset

The Offset control applies a small delay or advance in the timing of the clocks, relative to the host's transport. This can be used to compensate for any difference in the response time of the hardware being synced.



Trigger

If set to "Off", the clock pulses are a 50% duty cycle square wave. Otherwise, the clock pulses are fixed-length trigger pulses, and this control sets the trigger length in milliseconds.



ES Hardware Mode

Changing this from Off to ES-4 or ES-5 encodes the plug-in's outputs into a signal suitable for the relevant Expert Sleepers module.



Signal Routing

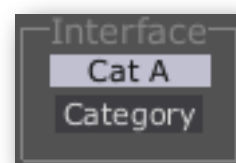
Silent Way Sync combines any signals at the plug-in's inputs with its outputs.

When ES Hardware Mode is Off, this simply means the signals are added together.

In ES-4 or ES-5 Mode, the signals are combined logically, to allow a stack of Sync plug-ins to generate clocks from multiple outputs of an ES-4/ES-5/ESX-8GT.

Interface Category

The Interface Category drop-down menu allows you to inform the plug-in of what kind of audio interface will be outputting the plug-in's signal. Please refer to



<http://expert-sleepers.co.uk/siwacategories.html>

for more details - the specifics are likely to be more fluid than should be put here in the user manual.

Silent Way Trigger



Introduction

Silent Way Trigger is a simple plug-in for generating a gate or envelope in response to an incoming MIDI note or CV trigger. A typical application would be for triggering drum sounds, where you might have a number of different sounds mapped to different notes.

The plug-in has a single output. If you want more than one output per note (e.g. a gate and an envelope) simply use multiple copies of the plug-in set to respond to the same note.

In many respects the Trigger plug-in is a cut-down version of the [Voice Controller](#), and many of the same ideas apply.

Setup

The 'Mode' menu selects one of the possible output signals for the plug-in. The options are Gate, Trigger, Envelope and Velocity, which all correspond to the similarly-named signals in the Voice Controller, below.

The 'Note' control sets which MIDI note will trigger the plug-in.

The 'Smooth' control has the same effect as that in the DC plug-in (see [above](#)).



CV Trigger

If the plug-in is configured to receive an input signal, you can optionally have it triggered by the incoming signal as well as or instead of by MIDI.

Pressing the 'Enable' button enables this feature.

The 'Threshold' knob sets the level the incoming signal has to exceed to trigger the plug-in. Note that this is strictly a DC level, not an amplitude. If you want to trigger the plug-in with an audio signal, precede it with an instance of Silent Way [Follower](#).



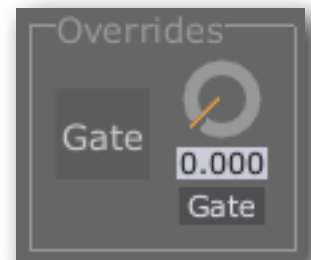
Voltages

The two knobs set the minimum and maximum voltages generated by the plug-in. Both range from -1.0 to +1.0, and it's fine for the Min to actually be higher than the Max, if for example you want an inverted envelope.



Overrides

Exactly the same as the Overrides in the Voice Controller, except that this plug-in has no Pitch output.



Trigger

The 'Length' control sets the length of the trigger pulse that is emitted in Trigger mode, in milliseconds.



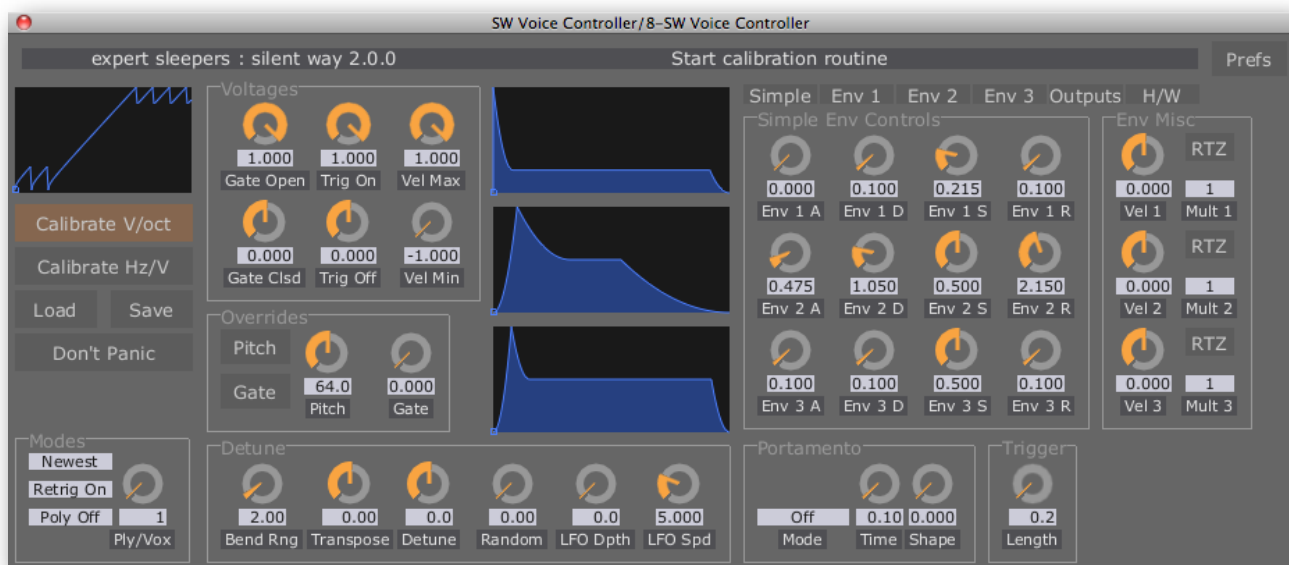
Envelope



The envelope controls are exactly the same as those of the Voice Controller's envelopes, though the full controls are always displayed. In terms of the Voice Controller's 'simple controls':

- A = Time A2
- D = Time A3
- S = Sustain
- R = Time R1

Silent Way Voice Controller



Introduction

Silent Way Voice Controller is a virtual instrument plug-in designed to directly control an analogue synthesiser by generating the appropriate CV and gate signals via an appropriate audio interface.

By listening to the synthesiser's output signal, the plug-in is able to calibrate itself to generate the appropriate pitch CV for the incoming MIDI notes.

As well as the basic pitch and gate signals, the plug-in can generate three envelope CVs which you can feed to VCAs, VCFs etc. in your synth.

Loading the plug-in

The Voice Controller is a 1-in 6-out plug-in. It exists in both effect and instrument configurations, depending on your host and platform. How you load it into your host depends on the host, but take into account that the plug-in needs to receive both audio and MIDI, and ideally expose more than just a stereo pair as outputs. Suggestions for various popular hosts are as follows:

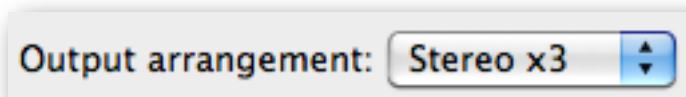
Host	Plug-in format	Comments
Live	AU/VST	Effect and instrument variants work equally well.

Host	Plug-in format	Comments
Logic	AU	Use instrument version. Load as a multi output plug-in (3x stereo). Use side chain input to get audio in. Create aux channels in the mixer to access extra channels (as you would for e.g. Ultra-beat).
Digital Performer	AU	Use effect version. Extra channels are available via bundles. NB be sure the track that the plug-in is to be loaded into is configured with a mono input and a stereo output, else the plug-in will not appear in the list of available plug-ins.
Cubase	VST	Use effect version for calibration and VSTi version thereafter.

VST Output Arrangement

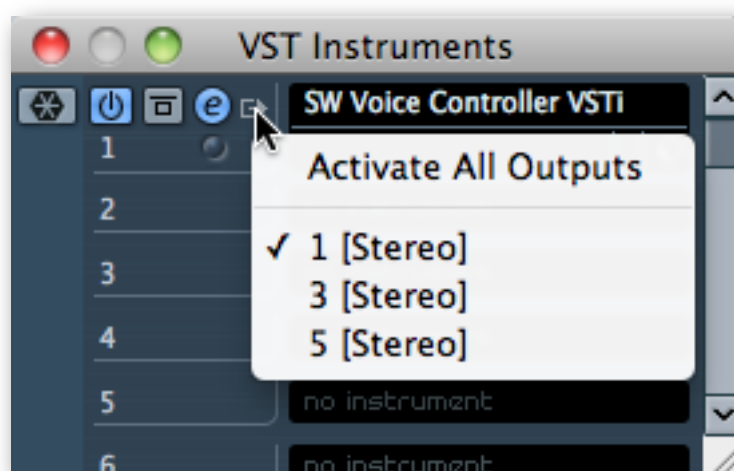
The VST versions of the plug-in allow you to choose whether you want the host to consider the outputs as a single 6 channel (usually interpreted as 5.1) bus, three stereo busses or six mono busses.

This setting is made in the Preferences dialog (see [below](#) for general information about the Preferences dialog) via a drop-down menu as shown.



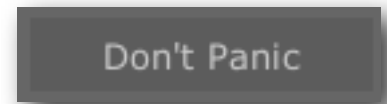
Note that the setting is global (it applies to all instances of the Voice Controller plug-in) and takes effect when the plug-in is next loaded.

To take advantage of this in Cubase you can load the plug-in via the 'VST Instruments' window. Then click on the outputs icon to activate the additional output busses.



Don't Panic

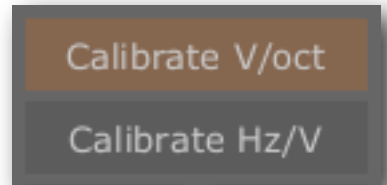
The button labelled 'Don't Panic' causes any currently sounding note to end - the gate closes, and the envelopes all go back to zero.



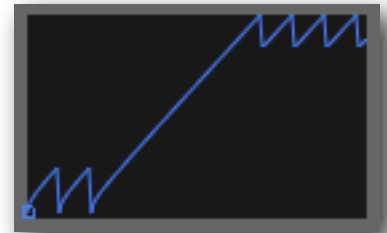
Calibration

The calibration process is quite simple:

- Connect the Voice Controller's pitch output (by default, output 1) to the pitch CV input of the oscillator that you want to control.
- Connect the oscillator's output to the Voice Controller's input. Ideally this would be a direct connection, not through any filter or other processing.
- Set the oscillator to generate a fairly simple waveform. Any basic square, triangle, sine etc. waveform will do.
- Press one of the 'Calibrate' buttons.



The plug-in will then generate a series of voltages and analyse the pitch it gets back from the oscillator. The calibration display (the left-most graph at the top of the plug-in GUI) will update during this process.



See the Expert Sleepers website for notes on calibrating specific oscillator/audio interface combinations, and for host application-specific tutorials.

For most synthesizers/modules you'll use the 'Calibrate V/oct' button. Synths that use the less common Hz/V standard include the Yamaha CS-30 and the Korg MS-20.

Saving and Loading Calibration Data

The plug-in's calibration data can be saved to and loaded from disk, independently of the normal plug-in preset save/load mechanism. This is accomplished with the two buttons below the calibration buttons. Pressing Save brings up a standard file browse dialog allowing you to name the file and choose where it is saved; pressing Load brings up a standard file browser dialog allowing you to choose the file to load.



The data is saved in a simple text file, which is easy to read and if necessary easy to edit. This opens up all sorts of possibilities for manually created or adjusted calibration data. Calibration files can also be used with [Silent Way Quantizer](#).

A typical calibration file might look like this:

```
Silent Way Calibration Data
version: 1
0 -0.98087925
1 -0.96048236
2 -0.94008547
3 -0.91968852
4 -0.89929163
```

(and so on - this example is truncated.)

The first two lines are an identifying header and a version number. The remaining lines are simple pairs of numbers: the first number is a MIDI note number, and the second is the output CV value that corresponds to that note.

Note that only notes that successfully calibrated are stored in the file, so you may find that the note numbers start at a value higher than 0, and end at a value less than 127.

Output Matrix

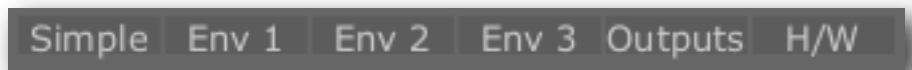


The Output Matrix section lets you select which of the plug-in's output signals appear on which of the six plug-in outputs.

Each row in the matrix corresponds to an output. Each has eight knobs which mix together the eight possible output signals. The knobs go down to -1.0 so you can add in a negated contribution from a signal.

By default outputs 1 to 6 correspond to Pitch, Gate, Env 1, Env 2, Env 3, and Trigger.

Initially the output matrix is hidden - reveal it by pressing the 'Outputs' button.



The eight output signals are as follows:

Offset

This is simply a constant offset. You might use it, for example, to set the centre frequency of a filter around which the envelopes modulate.

Pitch

The Pitch output derives from the current MIDI note that is sounding (or the pitch override signal - see below).

Gate

The gate output takes one of two levels, depending on whether a MIDI note is currently active or not. You would typically route this to the gate input of a hardware envelope generator.

Env 1/2/3

The envelope signals are generated by the internal multi-stage envelope generators. There are three independent envelopes. See below for more details.

Trigger

The trigger signal is a very short pulse, emitted whenever a new note sounds. You might typically route this to the retrigger input of a hardware envelope generator.

Velocity

The velocity output generates a voltage according to the velocity of the note being played. NB you can also use the note velocity to scale the envelopes - see below.

There is one additional knob per row:

Smooth

The 'Smooth' control has the same effect as that in the DC plug-in (see [above](#)).

Voltages

The Voltages section sets the actual output levels that are generated for the Gate, Trigger and Velocity outputs.

Gate Clsd/Open

Sets the voltages generated for the Gate signal when the gate is closed and open respectively.

Trig Off/On

Sets the voltages generated for the Trigger signal.

Vel Min/Max

Sets the voltage range generated for the Velocity signal.



Overrides

The Overrides section lets you override the pitch and gate outputs, so they're no longer controlled by the incoming MIDI notes. This is intended for use with parameter automation, so you can create patterns less easily obtainable by programming notes (e.g. pitch ramps). Note that you can also automate the enable buttons themselves, so you can switch between note control and direct control within a sequenced pattern.



Pitch

The Pitch button enables the pitch override; the knob sets the overridden pitch. The pitch knob is calibrated in MIDI note numbers (i.e. 1 increment per semitone).

Gate

The Gate button enables the gate override; the knob sets the overridden gate signal.

Detune

The Detune section lets you modify the pitch CV output from its 'true' value i.e. the value that would produce the pitch according to the input MIDI note.



Bend Rng

Sets the range (in semitones) of the pitch bend applied by incoming MIDI pitch bend messages.

Transpose

Applies a constant detune (in semitones) to the output pitch.

Detune

Applies a constant detune (in cents i.e. hundredths of a semitone) to the output pitch.

Random

Applies a random detune whenever a new note is triggered. Use this if you feel the tuning of your synth is too 'tight' when using Silent Way and you hanker for the sloppy tuning of analogue synths back in the good old days.

LFO Depth/Speed

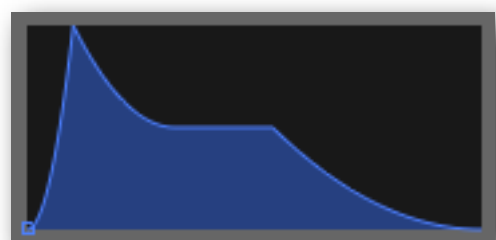
Applies a low-frequency modulation to the output pitch. This is intended as a convenient means to achieve a simple vibrato effect - for more complex pitch modulation, you can of course process the pitch CV in hardware in your modular system.

Envelopes

The Voice Controller includes three identical multi-stage envelope generators.

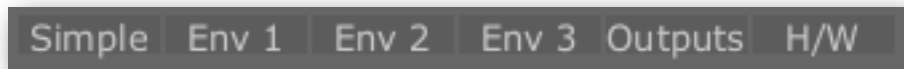
The shapes of the envelopes are shown graphically down the centre of the plug-in GUI.

There are two views on the envelope generator controls - a simple view which presents a traditional 'ADSR' view on all three envelopes at once, and a



complex view which offers all the possible controls on each envelope.

Select the view by pressing one of the four buttons above the envelope controls.



Simple Env Controls

Using the simple controls lets you set up a traditional ADSR (Attack-Decay-Sustain-Release) envelope shape.

The times are calibrated in seconds. For very fast times, remember that holding Shift while dragging the mouse increases the resolution of the changes.



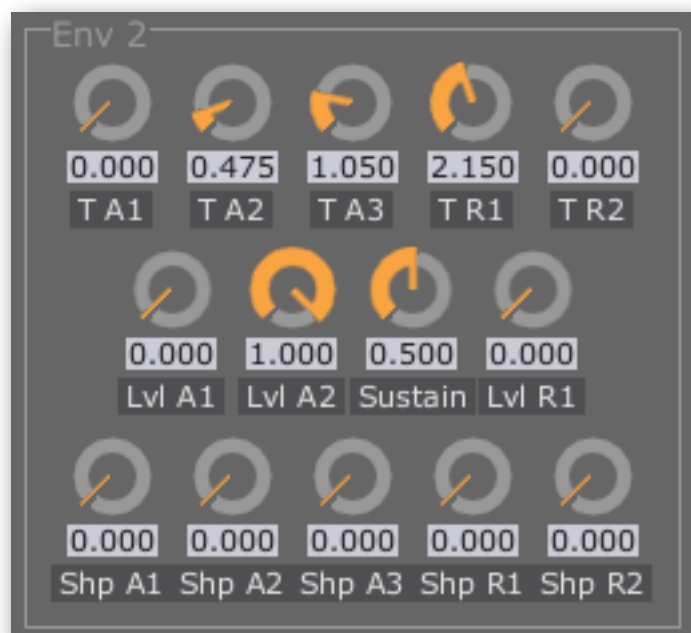
Full Env Controls

This alternate view exposes the full range of controls for each envelope generator.

There are three attack sections and two release sections, plus the sustain section. The shape of the curve in each section can be independently controlled.

In terms of the simple view, 'A' maps to 'Time A2', 'D' maps to 'Time A3', and 'R' maps to 'Time R1'.

If 'Level A1' remains at zero, 'Time A1' is essentially a delay before the envelope starts, which can be useful for auto-rhythmic effects.



Env Misc

The Env Misc group contains three more controls per envelope.

The Vel 1/2/3 knobs control how much Envelope 1/2/3 respectively are affected by the velocity of MIDI notes. At the default setting of 0.0 the envelope is not affected by velocity at all. At a setting of 1.0, the scale of the envelope is completely determined by the velocity - so a note with velocity zero will produce a constant zero envelope. At a setting of -1.0, the envelope depth is inversely related to the note velocity.

The Mult 1/2/3 dropdown menus allow you to apply a multiplier to the envelope times. E.g. when the multiplier is set to 10, all the envelope stages will take 10 times longer than the value displayed on the envelope knobs.

The 'RTZ' (Reset To Zero) buttons control whether each envelope always starts from zero, or whether it continues from its current value when retriggered.



Modes

The Modes section presents various options concerning how notes and envelopes are triggered in response to incoming MIDI notes.

Note Priority

Since the Voice Controller is essentially a monophonic synth, a scheme is required to determine which note sounds when multiple keys are held at the same time. The options are:

- Newest - the most recently pressed key sounds.
- Lowest - the lowest note sounds.
- Highest - the highest note sounds.



Retrigger Mode

This settings controls whether the envelopes retrigger when playing legato. The options are:

- Retrig On - the envelopes retrigger whenever a new note is triggered.
- Retrig Off - the envelopes only retrigger when all keys are released and a new note is played.

Note that these settings only affect the Voice Controller's internal envelopes. When using external envelope generators, you have the following options:

- If you just use the Gate output, you will end up with the same result as described for 'Retrig Off' above.
- If your envelope generator has a retrigger input as well as a gate input (for example, the Analogue Systems RS-60), you can connect the plug-in's Trigger output to the retrigger input to achieve the 'Retrig On' behaviour.
- Alternatively, you can use the output matrix to mix in a negative amount of the Trigger signal into the Gate output. This has the effect of momentarily closing the gate as seen by the synth, which should be enough to retrigger its envelopes.

Polyphonic Mode

The Voice Controller supports a polyphonic mode of operation i.e. one where multiple notes sound at once.

This is achieved using multiple instances of the plug-in - one per voice, plus one additional instance to act as the 'master' or controller.



The master plug-in should have its 'Poly Mode' menu set to 'Master'. The adjacent 'Ply/Vox' (short for 'Polyphony/Voice') knob controls the maximum polyphony i.e. the number of simultaneous voices that will sound. This should be set to the number of additional Voice Controller plug-ins that you're going to set up.

The voice plug-ins should have their Poly Mode menu set to 'Voice'. Each plug-in should have its Ply/Vox knob set to a different value - this is telling the plug-in which of the polyphonic voices it represents. So for example if in the master plug-in you set the polyphony to 4, you need 4 more voice plug-ins, with their voice set to 1, 2, 3 & 4 respectively.

Route the voice plug-in outputs to your synth hardware as normal, bearing in mind that each voice will need separate outputs. Unless you have a monster audio interface, it's unlikely that you'll need all 6 outputs from each plug-in.

The input from your synth that would normally go into each Voice Controller should be connected only to the input of the master plug-in. The master distributes this signal to the voice plug-ins as necessary.

The final step is to connect the master plug-in to the voice plug-ins. Exactly how you achieve this depends on your host application, but in general the idea is to route the master's output 1 to the input of all the voice plug-ins in the most direct way possible. Suggestions for various popular hosts are as follows.

Host	Comments
Live	Set the master's output to 'Sends Only' (effectively disabling it) and set each voice to receive input from the output of the master's track.
Logic	Set the master to output to a bus, and use this bus as the side-chain input for the voices. NB remember to prevent the bus from directly outputting to an audio output.
Digital Performer	Set the master to output to a bus, and use this bus as the side-chain input for the voices. NB the voice inputs need to be mono (or DP won't let you load the plug-in) so use a stereo bundle (e.g. Bus 1-2) for the master output and a mono bundle (e.g. Bus 1) for the voice inputs.

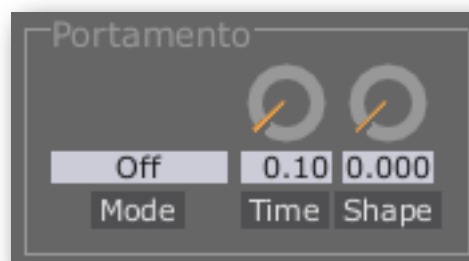
When in polyphonic master mode, the Voice Controller continues to output envelopes etc. via its outputs 3-6 as usual, as set up via the output matrix. However, the envelopes are now held in the sustain stage for as long as any note is held down. You can use this to recreate the playing styles of some vintage string synths, which were polyphonic but only had a single envelope shared between all the voices (aka 'paraphonic').

Portamento

Portamento, also sometimes called 'Glide', is when pitch changes smoothly between notes rather than suddenly jumping.

There are various portamento modes available:

- **Off** - no portamento is applied.
- **Auto** - the pitch always glides between notes.
- **Fingered** - the pitch glides between notes when played legato, and jumps otherwise.
- **CT Auto** - as Auto but the glide always takes a fixed time, no matter how close or far apart the two notes are. (CT stands for 'constant time'.)
- **CT Fingered** - as Fingered but the glide always takes a fixed time, no matter how close or far apart the two notes are.

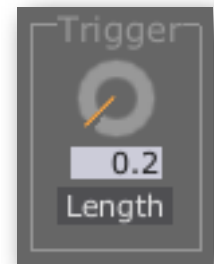


The 'Time' control sets how long the glide takes. For the CT modes, this is a value in seconds; otherwise it's just a number, where larger values mean a slower glide.

The 'Shape' control is only effective when using one of the CT modes. It controls the shape of the pitch curve, where zero is linear and one is more like an exponential curve.

Trigger

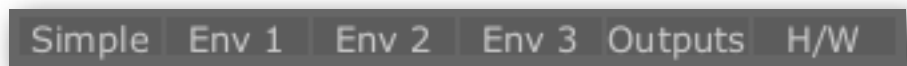
The 'Length' control sets the length of the trigger pulse that is emitted whenever a new note begins, in milliseconds.



Hardware Modes

The Voice Controller offers direct compatibility with the Expert Sleepers

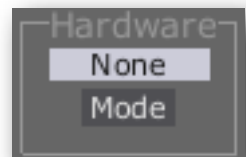
ES-4 SPDIF/CV Interface module, ESX-4CV CV Expander module and ESX-8CV CV Expander module. The controls for these modes are shown by pressing the 'H/W' button.



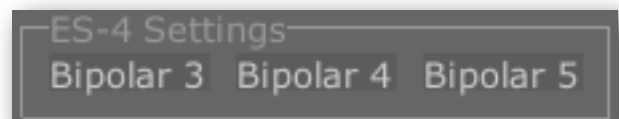
Hardware

The Hardware menu selects which device the plug-in is driving. The options are None (for normal operation), ES-4, ESX-4CV and ESX-8CV.

In ES-4 mode outputs 1 to 5 of the Voice Controller are combined into a stereo signal suitable for sending to the ES-4. This signal emerges from outputs 1&2 of the Voice Controller; outputs 3-6 carry their usual signals from the Output Matrix.



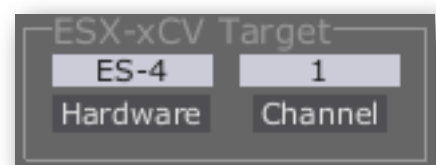
The three 'Bipolar' buttons should be set to reflect the ES-4's jumper settings.



In ESX-4CV mode outputs 1 to 4 of the Voice Controller are combined into a stereo signal suitable for sending to the ES-4, ES-40 or ES-5, in order to drive the 4 outputs of an ESX-4CV module. This signal emerges from outputs 1&2 of the Voice Controller; outputs 3-6 carry their usual signals from the Output Matrix.

In ESX-8CV mode outputs 1 to 6 of the Voice Controller are combined into a stereo signal suitable for sending to the ES-4, ES-40 or ES-5, in order to drive 6 of the outputs of an ESX-8CV module. (Outputs 7 & 8 of the module are unused.) This signal emerges from outputs 1&2 of the Voice Controller; outputs 3-6 carry their usual signals from the Output Matrix.

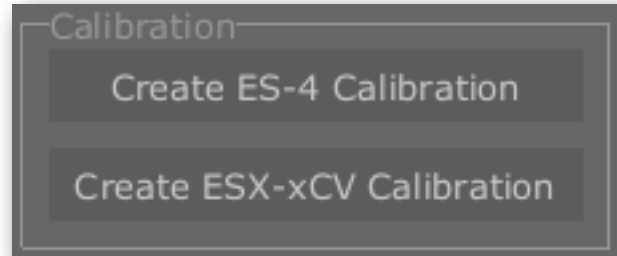
In ESX-4CV and ESX-8CV mode, the 'ESX-xCV Target' settings tell the plug-in to which expansion header the module in question is connected. The Hardware menu selects whether the expander is connected to an ES-4 (or ES-40) or ES-5. The Channel menu selects which expansion



header on the ES-4/40/5 the expander is connected to.

Default Calibrations

'Create ES-4 Calibration' overwrites the current calibration (if any) with a perfect 1V/octave curve, assuming the ES-4's hardware factory calibration. The 0V point is set to MIDI note 48 (C below middle C) - you may like to use the Voice Controller's Transpose setting if this is not suitable for your needs. You would almost certainly want to create a calibration in this way if using ES-4 Mode (above). You could also use it when not in ES-4 Mode, if the output of the Voice Controller will be sent to the input of an ES-4 Controller plug-in.



'Create ESX-xCV Calibration' overwrites the current calibration (if any) with a perfect 1V/octave curve, assuming the ESX-4CV or ESX-8CV's hardware factory calibration. Use this when routing the Voice Controller's output to the ESX-4CV Combiner or ESX-8CV Combiner plug-in, or when in ESX-4CV or ESX-8CV mode (see above).

Interface Category

The Interface Category drop-down menu allows you to inform the plug-in of what kind of audio interface will be outputting the plug-in's signal. Please refer to

<http://expert-sleepers.co.uk/siwacategories.html>

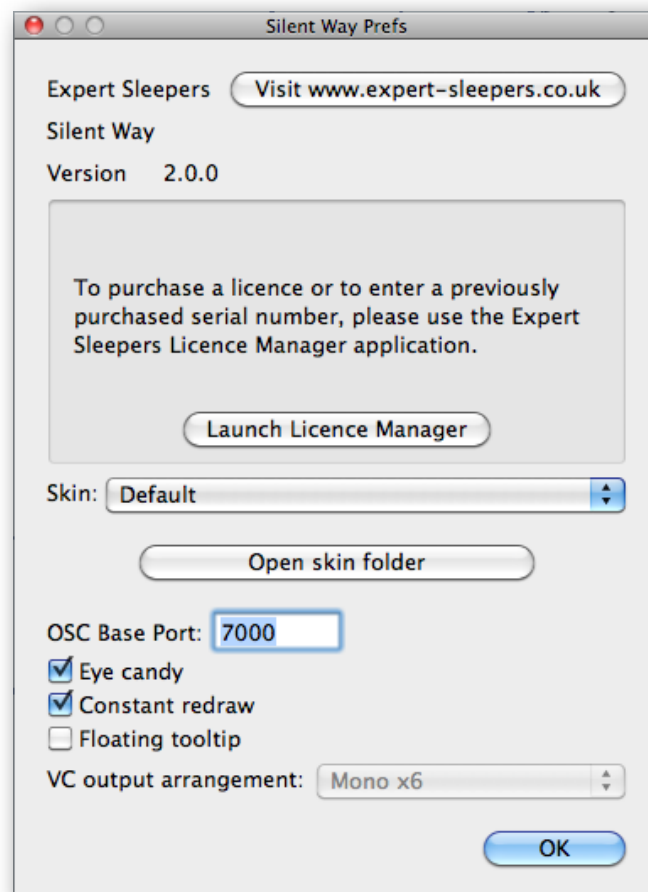


for more details - the specifics are likely to be more fluid than should be put here in the user manual.

Preferences

Pressing the 'Prefs' button brings up a dialog where various preferences are set. These settings are shared by all instances of Silent Way, and are not stored with presets.

Prefs



The top section shows the product version. The central section will show your serial number once you've bought a registration.

Skin

Allows you to choose a skin for the plug-in GUI. See [below](#).

OSC Base Port

Sets the base port number for OSC. See the documentation for Silent Way [Learner](#).

Eye candy

Enables the pretty graphics. Turn off if you don't like them, or if your computer has compatibility issues with drawing such things.

Constant redraw

Is on by default. If turned off, the GUI is only redrawn when a control changes. Use this if you're concerned that the GUI is wasting your CPU resources.

Floating tooltip

Causes the parameter name and value display (usually in the top right of the GUI) to be displayed above the mouse pointer.

VC output arrangement

See the description in the Voice Controller section, [above](#).

Skinning



Preamble

From Silent Way v2.0.0 onwards it is possible to completely redefine the plug-ins' GUIs. Possible changes range from simple colour scheme changes through to a complete redesign and rearrangement of the controls.

The skin GUIs are defined by script files, and by any graphical resources the scripts use (e.g. images for the buttons and knobs). The default GUI is defined in exactly the same way, so you can copy the default scripts and images and use those as a starting point for your customisations. Also, the scripts have been designed so that it's possible to override many settings (colours, images etc.) without having to redefine the whole UI script as well. It's possible to globally change the look of all the Silent Way plug-ins; equally a skin can alter just one plug-in, or set each plug-in to a different colour scheme.

The language used for the GUI scripts is Lua. You will find a complete description of the language, and some useful tutorials, at the Lua website: www.lua.org

All the standard language features of Lua are available in the GUI scripts, plus some extra functions specific to the Expert Sleepers GUI system.

Learn by example

The best way to learn about scripting the GUI is to look at the existing examples, particularly the default GUI scripts that ship with the plug-in. Just open up the plug-in bundle and find the gui.lua files within. (Windows users should download the Mac OS X version of the plug-in and get the scripts from there, since in the Windows version the scripts are munged into the plug-in as a Windows resource.)

Visit the [forum](#) if you have questions - or skins to share!

Anatomy of a Skin

Skins use the standard Mac OS X bundle system. Since this is essentially just a folder hierarchy with a special structure, this works just fine on Windows as well.

Skin location

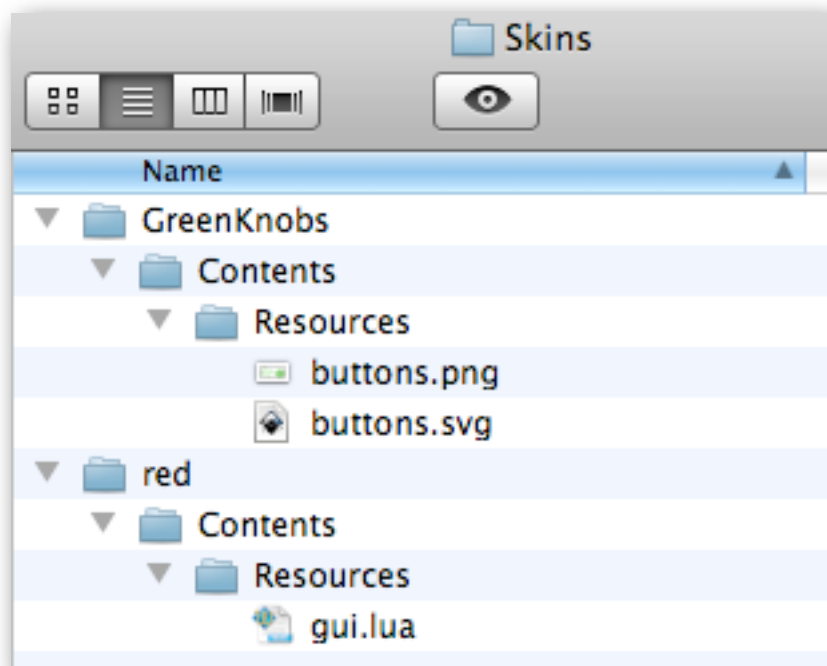
Skins must be stored in a particular location. Clicking the “Open skin folder” button in the [Preferences](#) window will open up a Finder (OS X)/Explorer (Windows) window showing where skins need to be installed.

Bundle structure

Inside the bundle’s folder, there is a Contents folder, and inside that, a Resources folder. The Resources folder contains any script and/or image files used by the skin.

The Contents folder may also contain an ‘Info.plist’ file. This is a convention for Mac OS X bundles but is not required by the skin system.

The image to the right shows a Finder window as opened by the “Open skin folder” button. (The folder is called “Skins”.) It contains two skins, “Green-



Knobs” and “red” (which are the skins illustrated at the [top of this section](#)). The ‘Green-Knobs’ skin includes an image file (‘buttons.png’, a replacement for the standard UI buttons). The ‘red’ skin includes a script file.

Note that the skin bundles may safely contain other files too (‘GreenKnobs’ includes the SVG file from which the PNG image was generated) and these are ignored by Silent Way.

Image requirements

Images used in skins should be in PNG format, and must be power-of-two sized in both width and height (e.g. 32x32, 128x16, 64x256).

More details to follow

In the meantime, [do please ask](#).

Notes on the AAX versions

There are a small number of differences/limitations in the AAX versions as compared to the Audio Unit or VST versions.

- The keyboard modifier for 'reset to default' is 'option' for the AAX version to be consistent with other Pro Tools plug-ins.
- Plug-ins with multiple inputs (e.g. Silent Way [ES-4 Controller](#)) are limited to the main stereo input 1/2 plus one extra mono input - this is a limitation of Pro Tools's sidechain implementation.
- All plug-ins are listed under Multichannel/Instruments and require a stereo track, except Silent Way [Voice Controller](#) & Silent Way [Trigger](#) which take a mono input.

Version History

2.3.0 20/12/13

- Added Silent Way ESX-8CV Combiner.
- Added polyphonic MIDI splitting to Silent Way ES-4 Controller and Silent Way ES-5 Controller.
- Added ESX-8CV mode to Silent Way Voice Controller.
- Fixed a bug which was causing glitches in the paraphonic envelope outputs of Silent Way Voice Controller in poly master mode.

2.2.3 15/10/13

- First 64 bit AAX release on Windows.

2.2.2 2/9/13

- Fixed an issue with some 64 bit hosts, notably Presonus Studio One.

2.2.1 20/8/13

- First 64 bit AAX release for Mac OS X.

2.2.0 10/4/13

- Added Silent Way Logic Project.
- Added controls for Interface Categories.
- Silent Way Step LFO can now be reset and/or triggered by MIDI notes and/or incoming CVs.
- Added 'Gate Length' control to Silent Way Step LFO.
- Added 'Random' feature to Silent Way Step LFO.
- Silent Way CV To MIDI, VST version, can now output MIDI direct to the host.
- Silent Way CV To MIDI can now output MIDI directly to Silent Way Learner.
- Silent Way Learner now supports MIDI polyphonic pressure messages.
- Added 'SMUX Proof' mode for Silent Way ESX-4CV Combiner.
- Fixed Silent Way Learner, VST and AU versions, to correctly output silence.

2.1.0 24/1/13

- Added Silent Way Function.
- Added "Calibrated" mode to Silent Way Follower.
- Added "Transport2" sync mode to Silent Way LFO.
- Added "Transfer" button to Silent Way Soundplane and Silent Way Follower.
- Added support for the Expert Sleepers ES-5 module to Silent Way Sync.
- Added sustain pedal support to Silent Way Voice Controller.
- Fixed a bug that would cause Silent Way Follower to lock up the host application.

2.0.3 20/12/12

- First AAX release (Mac OS X).
- Fixed two issues with MIDI CC control via Silent Way Learner: bipolar parameters (e.g. those with a value range of ± 1) now take the value zero at a CC value of 64; the various 'divisor' parameters (e.g. in Silent Way Sync) now behave correctly.

2.0.2 2/10/12

- Fixed blank UI problem in Cubase on Windows.

2.0.1 7/9/12

- Fixed a problem that prevented use of the plug-in status bar (mute, presets etc.) in Cubase Mac OS X 32 bit.
- Added the ability to skin the colours of the various graph elements in the UIs (e.g. envelope displays).

2.0.0 28/8/12

- Added Silent Way ES-5 Controller, Silent Way ESX-4CV Combiner, Silent Way Follower, Silent Way Learner and Silent Way Soundplane.
- Silent Way ES-4 Controller is now part of the main Silent Way suite.
- All plug-ins are now installed in a single bundle (OS X)/dll (Windows).
- 64 bit support (OS X and Windows).
- New GUI look.
- Added skinning.
- Added MIDI learn.
- Added new OSC control features.
- Double-click to reset knobs to default.
- Cursor keys now increment/decrement value boxes.
- Silent Way LFO can be reset by incoming MIDI notes.
- Added Silent Way ES-4 Controller 'Input To Gates' feature.
- Fuller MIDI support for ES-4/5 Controller MIDI output (including SysEx).
- Added Silent Way Sync 'Mute Clock' & 'Multiplier' controls, and added the possibility to invert Gate Expander outputs.
- Added 'CV Trigger' and 'Multiplier' to Silent Way Trigger.
- Numerous other small fixes and enhancements.

1.7.3 23/7/12

- Added a workaround to the Silent Way Sync plug-in for a Logic Pro bug which could cause erratic clock output.

1.7.1 25/11/11

- Fixed the behaviour of the Silent Way Sync plug-in when the host's transport was in cycle mode.

1.7.0 24/11/11

- Added the Silent Way Sync plug-in.
- Fixed various issues with parameter automation and GUI updates.

1.6.14 31/10/11

- Added Trigger Length control to Silent Way Voice Controller and Silent Way Trigger.
- Fixed a bug in the behaviour of Newest note priority mode in Silent Way Voice Controller.

1.6.11 5/10/11

- The AU Generator variants of the Silent Way DC, Silent Way CV Input, Silent Way LFO and Silent Way Step LFO plug-ins have been replaced by AU Instrument variants, so as to be compatible with AU validation under OS X Lion.
- Added 'Reset By Note' option to Silent Way LFO.
- Added visual feedback of the LFO's position in its cycle to Silent Way LFO.
- Added a 'Create ES-4 Calibration' button to Silent Way Quantizer.

1.6.10 19/9/11

- Added 'Transpose' and ES-4 mode options to Silent Way Voice Controller.

1.6.7 21/4/11

- Added the 'Output arrangement' option to the VST versions of the Silent Way Voice Controller plug-in.

1.6.6 30/3/11

- Fixed the Windows version of the Silent Way CV Input plug-in for compatibility with the Expert Sleepers ES-2-2 module.

1.6.5 4/2/2011

- Added the Silent Way SMUX plug-in.

1.6.4 22/11/2010

- Added support for the Expert Sleepers ES-2-2 module to the Silent Way CV Input plug-in.
- (VST only) Added a 6 channel variant of the Silent Way AC Encoder plug-in.

1.6.3 30/8/2010

- (Windows only) Fixed a problem where only one plug-in's UI would work when multiple Silent Way plug-ins were opened in the same host.

1.6.2 9/8/2010

- Added the envelope multiplier controls.

1.6.1 2/8/2010

- Increased the maximum range of the Silent Way Voice Controller's pitch bend function.

1.6.0 28/6/2010

- Added support for musical scales to Silent Way Quantizer.
- Changed all the plug-in names (that appear in host UIs) from "Silent Way ..." to "SW ...", so that more of the actual name is visible when space is limited.
- Fixed GUI issue in Reaper on Windows.

1.5.5 28/4/2010

- Extended the range of Silent Way LFO's Beat Divisor parameter down to 1/128th notes, in order to address a problem with setting up the VST versions of the plug-in to output DIN Sync.

1.5.4 20/4/2010

- Fixed a bug in the Silent Way Quantizer plug-in that could cause the quantized note name to be displayed incorrectly when in 'Calibrated' mode.

1.5.3 29/3/2010

- Added the VSTi version of the Silent Way Voice Controller plug-in.

1.5.2 16/3/2010

- Added the Silent Way AC Encoder plug-in.

1.5.1 12/1/2010

- Added the Silent Way Quantizer plug-in.
- Added the Silent Way CV To MIDI plug-in.
- Added 'Random Tuning' feature to Silent Way Voice Controller.
- Added ability to save and load calibration data to Silent Way Voice Controller.

1.5.0 12/11/2009

- Added the Silent Way Step LFO plug-in.
- Changed the Smooth control on all plug-ins to be calibrated in milliseconds, and to have a much larger range.
- From here on all Mac OS X versions require Mac OS X 10.4 or higher.

1.4.4 15/10/2009

- Added the Silent Way CV To OSC plug-in.

1.4.3 5/10/2009

- Added the Silent Way CV Input plug-in.
- Fixed an issue with the AU Generator versions of Silent Way DC & LFO when loaded as mono plug-ins.

1.4.2 1/10/2009

- Mac OS X VST only - addressed an issue where the GUIs would appear in slightly the wrong place in Cubase.

1.4.1 28/9/2009

- Added 'AU Generator' variants of Silent Way DC & LFO.

1.4.0 25/9/2009

- Added Silent Way Trigger plug-in.
- Added smoothing option on all outputs of all plug-ins.
- Added 'swing' feature to Silent Way LFO.
- Added portamento feature to the Voice Controller.
- Fixed a bug that would very occasionally cause the GUIs to be corrupted.

1.3.0 4/9/2009

- Added polyphonic support for the Voice Controller plug-in.
- Added envelope Reset To Zero controls.
- Updated all plug-ins for OS X 10.6 compatibility.

1.2.0 26/8/2009

- Added the Silent Way LFO plug-in.

1.1.0 29/7/2009

- The Voice Controller AU now has an effect variant so it will work in Digital Performer.
- Added new OSC commands (registerOSCPATHForParameter() and registerOSCPATHForParameterNormalized()) added, primarily for compatibility with TouchOSC.
- Output configuration changed from a set of drop-down menus to a full matrix of knobs.
- Envelope scale parameters removed, since the same functionality is now offered by the output matrix.
- Added new 'velocity' output.
- Added velocity-based scaling of envelopes.

- Added Hz/V calibration mode.
- Areas of the full MIDI note range not covered during calibration are now filled with 'wrapped around' values from octaves that are covered.
- Added note priority modes (last/low/high) and retrigger modes (on/off).
- Added 'panic' button.
- Fixed some incorrect envelope triggering behaviours.
- The 'trigger' output is now slightly longer than before (it was previously a single audio sample).

NB v1.1.0 is not preset-compatible with earlier versions.

1.0.2 3/7/2009

- The Voice Controller VST plug-ins are no longer virtual instruments, they are effects. This allows Cubase to handle them properly.

1.0.1 30/6/2009

- The Voice Controller AU now defines 3 stereo busses rather than 1 6 channel bus, which allows Logic to handle it properly.

1.0.0 29/6/2009

- First release.

Contact

The Expert Sleepers website is here:

<http://www.expert-sleepers.co.uk/>

Or you can email

info@expertsleepers.co.uk

Or you can use the Expert Sleepers forum, which is here:

<http://www.kvraudio.com/forum/viewforum.php?f=85>

Or you can use the dedicated Silent Way forum, which is here:

<http://www.muffwiggler.com/forum/viewforum.php?f=35>

Acknowledgements

The software described in this manual makes use of the following open source projects. The author is greatly indebted to them for their efforts and generosity.

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Lua



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oscpack

oscpack -- Open Sound Control packet manipulation library
<http://www.audiomulch.com/~rossb/code/oscpack>

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glew

The OpenGL Extension Wrangler Library

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Mesa 3-D graphics library

Version: 7.0

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FTGL

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